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A045

EARTHQUAKE

1.0 ENTRY CONDITIONS

IF moderate to severe vibrations occur throughout the plant,

OR seismic recorder indicates a seismic event has taken place,

THEN use this procedure.

2.0 IMMEDIATE ACTIONS

Note

There are no immediate actions in this procedure.

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3.0 FOLLOW-UP ACTIONS

ACTIONS	DETAILS
3.1 ___ Notify personnel of plant conditions as required.	o ___ Plant Operators o ___ SOTA o ___ SSOD to evaluate plant conditions for potential entry into the Emergency Plan.
3.2 ___ Concurrently perform VP-540, Runback Verification Procedure.	
3.3 ___ IF the entry conditions of EOP-2, Vital System Status Verification are met, THEN trip the Rx, AND GO TO EOP-2. CONCURRENTLY PERFORM this procedure as resources become available.	Depress the Rx Trip pushbutton.
3.4 ___ Verify rod index is within limits. IF NOT, THEN refer to ITS.	o Refer to computer group 59. o Refer to the COLR. o Refer to ITS 3.1.5, Safety Rod Insertion Limits. o Refer to ITS 3.2.1, Regulating Rods Insertion Limits.

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3.0 FOLLOW-UP ACTIONS (CONT'D)

ACTIONS	DETAILS
3.5 ___ Verify quadrant power tilt is within limits. IF NOT, THEN refer to ITS 3.2.4, Quadrant Power Tilt.	o Refer to computer group 59. o Refer to the COLR.
3.6 ___ Maintain imbalance within limits. IF NOT, THEN refer to ITS 3.2.3, Axial Power Imbalance Operating Limits.	o Observe SPDS imbalance display. o Adjust APSRs to maintain imbalance. o Refer to the COLR for limits.
3.7 ___ Verify rods are within ± 6.5% of their group average height. IF NOT, THEN refer to ITS 3.1.4, Control Rod Group Alignment Limits.	
3.8 ___ IF evaluation of the entry conditions indicate that plant equipment has caused vibrations, THEN exit this procedure.	
3.9 ___ Perform survey of plant for injured personnel.	IF injured personnel are found, THEN notify EMT, OR notify a member of the Medical Emergency Team.

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3.0 FOLLOW-UP ACTIONS (CONT'D)

ACTIONS	DETAILS
3.10___ IF Rx is tripped, THEN determine shutdown margin.	Refer to SP-421, Reactivity Balance Calculations.
3.11___ Observe indications for loose parts in RCS.	Refer to OP-506, LPMS Data Handling Recording and Analysis.
3.12___ Establish stable RCS conditions AND determine RCS leak rate.	Refer to SP-317, RCS Water Inventory Balance.
3.13___ Notify Chemistry to sample RCS for fuel failure.	
3.14___ Perform EDG test.	o Refer to SP-354A, Monthly Functional Test of the Emergency Diesel Generator EGDG-1A. o Refer to SP-354B, Monthly Functional Test of the Emergency Diesel Generator EGDG-1B.
3.15___ Perform comprehensive physical inspection of entire plant.	Observe: o Sump levels, o Radiation monitors, o Tank levels, o H2 tank level.

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3.0 FOLLOW-UP ACTIONS (CONT'D)

ACTIONS	DETAILS
3.16___ Notify I&C Tech to remove tapes from Seismic recorders and determine, from tapes, maximum vibration reading.	Obtain copy of tapes and give to SSOD.
3.17___ IF Seismic Recorder indicates $\geq$ 0.05g, THEN notify Computer and Controls Engineer to perform instrumentation tests.	
3.18___ IF fuel failure is detected, THEN refer to ITS 3.4.15, RCS Specific Activity.	
3.19___ Notify department managers to determine any additional surveillance requirements.	
3.20___ Determine subsequent actions based on results of physical inspection.	

LOSS OF NUCLEAR SERVICE WATER

1.0 ENTRY CONDITIONS

IF any of the following conditions exist:

- o TEMPs of SW cooled components are high and rising,
- o SW surge tank is < 5 ft,
- o SW flow is lost,

THEN use this procedure.

2.0 IMMEDIATE ACTIONS

Note

There are no immediate actions in this procedure.

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3.0 FOLLOW-UP ACTIONS

ACTIONS	DETAILS
3.1 ___ Notify personnel of plant conditions as required.	___ SOTA, ___ Plant Operators, ___ SSOD to evaluate plant conditions for potential entry into the Emergency Plan.
3.2 ___ IF at any time while performing this procedure, any of the following conditions exist: o SW surge tank is < 1 ft, and level can NOT be restored o SW flow is lost, and can NOT be restored o Multiple CRDM stator TEMPs are ≥ 180°F, THEN trip the Rx. AND CONCURRENTLY PERFORM EOP-2, Vital System Status Verification, beginning with Step 2.1.	Depress the Rx Trip pushbutton.
3.3 ___ IF SW flow is lost, AND SW surge tank is > 1 ft, THEN start 1 SW pump.	Start 1 of the following: o SWP-1A, o SWP-1B, o SWP-1C.
3.4 ___ IF SW surge tank is < 5 ft, THEN increase DW flow to SW surge tank.	o Start both DW transfer pumps WTP-6A and WTP-6B. o Notify Building Operators to look for high DW usage.

3.2 IF any of the following conditions exist:

- o SW surge tank is < 1 ft, and level can NOT be restored,
- o SW flow is lost and can NOT be restored,
- o Multiple CRDM stator TEMPs are ≥ 180°F,

THEN trip the Rx.
AND CONCURRENTLY PERFORM
EOP-2, Vital System Status Verification,
beginning with Step 2.1.

Table 1: SW Cooled Components.

___ RB Main fan assemblies

___ Letdown coolers

___ RCDT cooler

___ CRDMs

___ SF coolers and air handling units

___ Sample coolers

___ Seal return coolers

___ Evaporators

___ WG compressors

___ EFP-1

___ SWP-1A, SWP-1B and SWP-1C

___ RWP-2A, RWP-2B and RWP-1

___ IA and SA compressors, if aligned

___ Water box ARPs, if aligned

___ Control Complex chillers, if aligned

___ RCPs

___ MUPs if aligned

ACTIONS	DETAILS
3.5 ___ IF DW makeup to the SW surge tank is NOT available, THEN use FS water for makeup.	Notify AB Operator to align the FS header for SW surge tank makeup: 1 ___ Connect pre-staged hose between FSV-186 and SWV-520. 2 ___ Close SWV-298. 3 ___ Open FSV-186. 4 ___ Open SWV-520. 5 ___ Maintain SW surge tank > 5 ft using the SW fill valve, SWV-277. 6 ___ Notify TB Operator to place the Motor driven FS pump, FSP-1, on recirc.
3.6___ IF SW surge tank is < 1 ft, THEN: 1 ___ Ensure operating MUP is DC cooled, 2 ___ Stop all SWPs, 3 ___ Stop all SW cooled RWPs.	Stop SW cooled pumps by: 1 ___ Select SWP-2A and SWP-2B to "PULL TO LOCK." 2 ___ Ensure SWP-1C and RWP-1 in NORMAL AFT STOP. 3. Maintain pumps in stopped position: ___ SWP-1A ___ SWP-1B ___ RWP-2A ___ RWP-2B. 4. Open DC knife switch at ES 4160V Bkr for: ___ SWP-1A ___ SWP-1B ___ RWP-2A ___ RWP-2B.

3.2 IF any of the following conditions exist:

- o SW surge tank is < 1 ft, and level can NOT be restored,
- o SW flow is lost and can NOT be restored,
- o Multiple CRDM stator TEMPs are ≥ 180°F,

THEN trip the Rx.
AND CONCURRENTLY PERFORM
EOP-2, Vital System Status Verification, beginning with Step 2.1.

Table 1: SW Cooled Components.

___ RB Main fan assemblies

___ Letdown coolers

___ RCDT cooler

___ CRDMs

___ SF coolers and air handling units

___ Sample coolers

___ Seal return coolers

___ Evaporators

___ WG compressors

___ EFP-1

___ SWP-1A, SWP-1B and SWP-1C

___ RWP-2A, RWP-2B and RWP-1

___ IA and SA compressors, if aligned

___ Water box ARPs, if aligned

___ Control Complex chillers, if aligned

___ RCPs

___ MUPs if aligned

3.0 FOLLOW-UP ACTIONS (CONT'D)

ACTIONS	DETAILS
3.7 ___ IF SW flow is lost to the RCPs for > 5 min, THEN ensure Rx tripped and trip all RCPs, AND isolate SW to the RCPs.	1 ___ Trip all RCPs 2 ___ Ensure oil lift pumps Auto start. 3 ___ Isolate SW to the RCPs, close the following: ___ SWV-80, RCP-1A ___ SWV-79, RCP-1B ___ SWV-82, RCP-1C ___ SWV-81, RCP-1D
3.8 ___ IF SW flow does NOT exist, THEN stop or isolate SW cooled components.	See Table 1 for SW cooled components.
3.9 ___ IF CRDM TEMPS are the only TEMPS increasing, THEN increase CRDM cooling.	o Observe computer points X-211 through X-279. o Ensure SWV-109 and SWV-110 are open. o Increase CRDM cooling by: ___ Start Emergency Duty SW pump, SWP-1A or SWP-1B ___ Start both CRDM booster pumps ___ SWP-2A ___ SWP-2B ___ Place spare CRD filter in service ___ Fail open SW-763: Isolate and vent air to SW-224-TIC via filter regulator left of SW-224-TIC located 119, AB in RMA-6 Pen area ___ Isolate TEMP control loop: Close SW-766 and SW-767 (95' AB by CRDM booster pumps)

3.2 IF any of the following conditions exist:

- o SW surge tank is < 1 ft, and level can NOT be restored,
- o SW flow is lost and can NOT be restored,
- o Multiple CRDM stator TEMPs are ≥ 180°F,

THEN trip the Rx.
AND CONCURRENTLY PERFORM
EOP-2, Vital System Status Verification,
beginning with step 2.1.

Table 1: SW Cooled Components.

___ RB Main fan assemblies

___ Letdown coolers

___ RCDT cooler

___ CRDMs

___ SF coolers and air handling units

___ Sample coolers

___ Seal return coolers

___ Evaporators

___ WG compressors

___ EFP-1

___ SWP-1A, SWP-1B and SWP-1C

___ RWP-2A, RWP-2B and RWP-1

___ IA and SA compressors, if aligned

___ Water box ARPs, if aligned

___ Control Complex chillers, if aligned

___ RCPs

___ MUPs if aligned

ACTIONS	DETAILS
3.10___ IF SW flow exists, AND SW cooled component TEMPs are increasing, THEN ensure maximum SW cooling to essential components.	Ensure: ___ Emergency Duty SW RW pump is operating, RWP-2A or RWP-2B, ___ Emergency Duty SW pump is operating, SWP-1A or SWP-1B, ___ The "RW RECIRC CONTROL SURVEILLANCE SWITCH" is in the "NORMAL" position. Located on the Bkr cubicle for RWP-3B in the B ES 4160 V Switchgear Room, ___ The RW Recirc Control valve, RWV-150, is either closed or isolated, ___ All SW heat exchangers are in service, ___ Non-essential components are isolated, see Table 1 for list of SW cooled components, ___ Proper intake canal conditions exist, ___ RB Fans are aligned to CI.
3.11___ IF SW leak exists, THEN determine location of leak.	o Observe Bldg sump levels. o Observe RCDT level. o Observe DC surge tank level.
3.12___ IF SW leak is in the RB, THEN isolate SW to non-essential loads in RB, AND notify Operator to perform SW walkdown in RB, if possible,	See Table 1 for SW cooled components.

3.2 IF any of the following conditions exist:

- o SW surge tank is < 1 ft, and level can NOT be restored,
- o SW flow is lost and can NOT be restored,
- o Multiple CRDM stator TEMPs are ≥ 180°F,

THEN trip the Rx.
AND CONCURRENTLY PERFORM
EOP-2, Vital System Status Verification,
beginning with Step 2.1.

Table 1: SW Cooled Components.

___ RB Main fan assemblies

___ Letdown coolers

___ RCDT cooler

___ CRDMs

___ SF coolers and air handling units

___ Sample coolers

___ Seal return coolers

___ Evaporators

___ WG compressors

___ EFP-1

___ SWP-1A, SWP-1B and SWP-1C

___ RWP-2A, RWP-2B and RWP-1

___ IA and SA compressors, if aligned

___ Water box ARPs, if aligned

___ Control Complex chillers, if aligned

___ RCPs

___ MUPs if aligned

3.0 FOLLOW-UP ACTIONS (CONT'D)

ACTIONS	DETAILS
3.13 ___ IF SW leak is in the AB, THEN notify AB Operator to perform SW walkdown.	Notify AB Operator to: ___ Observe local SW tank level, ___ Ensure proper SW valve alignment. Refer to OP-408, Nuclear Services Cooling System. ___ Observe normal SW and SW RW Pump discharge pressures.
3.14 ___ IF SW leak exist and can NOT be found, THEN determine if SW heat exchangers are leaking.	1. Notify AB Operator to place standby SW heat exchanger in service and to isolate 1 inservice SW heat exchanger. 2. Repeat the above process 1 at a time until all SW heat exchangers have been isolated.
3.15 ___ IF adequate SW cooling can NOT be established, THEN GO TO OP-209, Plant Cooldown, beginning with appropriate Step, based on RCS TEMP and PRESS.	
3.16 ___ IF adequate SW cooling has been restored, THEN EXIT this procedure. GO TO the appropriate procedure as determined by the SSOD.	

EMERGENCY DIESEL GENERATOR ACTUATION

1.0 ENTRY CONDITIONS

IF 4160V ES Bus UV occurs,

THEN use this procedure.

2.0 IMMEDIATE ACTIONS

Note

There are no immediate actions for this procedure.

This Procedure Addresses Safety Related Components

Approved by MNPO (SIGNATURE ON FILE) Date 5/31/94

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3.0 FOLLOW-UP ACTIONS

ACTIONS	DETAILS
3.1 ___ Notify personnel of plant conditions as required.	___ SOTA ___ Plant operators ___ SSOD to evaluate plant conditions for potential entry into the Emergency Plan

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3.2 ___ IF both ES 4160V buses are energized,
THEN GO TO step 3.6 in this procedure.

3.3 ___ IF at any time, an EDG fails to energize its respective bus,
THEN check the bus overcurrent lockouts before attempting to re-energize.

1. Check overcurrent lockouts on the SSR section of the MCB for the affected bus.

   ES 4160V Overcurrent Lockouts:

ES Bus 3A	ES Bus 3B
___86B-3205	___86B-3206
___86B-3207	___86B-3208
___86B-3211	___86B-3212

2 ___ IF no overcurrent lockouts are actuated,
THEN efforts should be made to energize the bus.

3 ___ IF any overcurrent lockout is found actuated,
THEN do NOT attempt to energize the bus until the fault has been determined and corrected.

Applicable Carry-over steps:
3.3 IF at any time, an EDG fails...

3.0 FOLLOW-UP ACTIONS (CONT'D)

ACTIONS	DETAILS

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CAUTION

Per step 3.3, do not attempt to energize a bus that has actuated overcurrent lockouts.

****

3.4 IF an EDG fails to energize its respective bus,
AND any of the following power sources are energized:

___ BEST

___ Offsite Power Transformer

___ Aux Transformer,

THEN prepare the dead bus for re-energization.

1. Ensure all feeder Bkrs to affected bus are open.

   ES 4160V Bus Feeder Bkrs:

Feeder	A Bus	B Bus
BEST	___3205	___3206
Offsite	___3211	___3212
Aux	___3207	___3208
EDG	___3209	___3210

2 ___ Select MUPs on the dead bus to Normal After Stop.

3 ___ IF the "4160V ES BUS ES/UV BLOCK LOCK OUT" has actuated,
THEN defeat it for the affected bus:

- o Notify available PPO to open knife switch "AY" in the "DUMMY" cubicle for the affected ES 4160V Bus
- o WHEN "AY" is open, THEN reset UV lockout by depressing "4160 ES UV RESET" pushbutton for the affected bus.

Applicable Carry-over steps:
3.3 IF at any time, an EDG fails...

3.0 FOLLOW-UP ACTIONS (CONT'D)

ACTIONS | DETAILS

****

CAUTION

Per step 3.3, do not attempt to energize a bus that has actuated overcurrent lockouts.

****

3.5 ___ IF an EDG fails to energize its respective bus, AND power is available to re-energize the bus, AND the bus has been prepared for re-energization, THEN energize the bus from the available power source.

1. Close feeder Bkr from the available power source by holding in "CLOSE" position until the "4 KV ES BUS DEAD" annunciator alarm clears (normally ≤ 10 seconds).

   ES 4160V BUS Feeder Bkrs:

Feeder	A Bus	B Bus
BEST	___3205	___3206
Offsite	___3211	___3212
Aux	___3207	___3208

2 ___ IF opened in step 3.4, THEN notify available PPO to yclose knife switch "AY" in the "DUMMY" cubicle for the affected ES 4160V Bus.

Applicable Carry-over steps:
3.3 IF at any time, an EDG fails...

3.0 FOLLOW-UP ACTIONS (CONT'D)

ACTIONS	DETAILS
3.6 ___ CONCURRENTLY PERFORM VP-580, Plant Safety Verification Procedure, beginning with Step 3.1.	
3.7 ___ IF letdown flow has been lost, THEN isolate letdown.	1 ___ Close MUV-49 "LETDN CLR ISO". 2 ___ IF MUV-49 will not close, THEN close: o MUV-50 "BLK ORIFICE ISO" o MUV-51 "LETDOWN FLOW" control.
3.8 ___ WHEN letdown flow restoration is desired, THEN Refer to Enclosure 1, RC Letdown Recovery. Continue on in this procedure.	

Applicable Carry-over steps:
3.3 IF at any time, an EDG fails... 3.8 WHEN letdown flow restoration is desired, THEN Refer to Enclosure 1...

ACTIONS | DETAILS

****

CAUTION

Per step 3.3, do not attempt to energize a bus that has actuated overcurrent lockouts.

****

3.9 ___ IF the affected bus has not been energized,
AND any of the following EDG failures have occurred:

- o An EDG failed to start
- o An EDG tripped after starting,

THEN correct the cause of the failure and energize the affected bus.

Failed EDG recovery:

1 ___ Notify PPO to block the EDG start command by selecting the "NORMAL AT ENGINE" switch to "AT ENGINE" on the tripped EDG gauge board.

2 ___ Ensure condition causing failure of the EDG is corrected.

3 ___ Select MUPs on the dead bus to Normal After Stop.

4 ___ IF the knife switch "AY", in "DUMMY" cubicle was opened per step 3.4,
THEN notify available PPO to close knife switch "AY" in the "DUMMY" cubicle for the affected ES 4160V bus.

5 ___ Notify PPO to depress the "RESET" push button on the EDG gauge board.

6 ___ Wait at least 2 minutes to allow the shutdown relays to reset.

7 ___ Notify PPO to select the "NORMAL AT ENGINE" switch to "NORMAL" on the EDG gauge board.

The EDG should start and energize the bus if an UV condition exists.

Applicable Carry-over steps:
3.3 IF at any time, an EDG fails... 3.8 WHEN letdown flow restoration is desired, THEN Refer to Enclosure 1...

Table 1: EDG Rating

	Load range in MW
Maximum load	3.5
30 min	> 3.25 to ≤ 3.5
200 hr	> 3.0 to ≤ 3.25
2000 hr	> 2.85 to ≤ 3.0
Continuous	≤ 2.85

Table 2: EDG Loads to Shed

Loads	MW
EFP-1	0.528
SWP-1A or SWP-1B	0.486
RWP-2A or RWP-2B	0.538
AHF-1A or AHF-1B or AHF-1C	0.061

Table 3: ES 480V Load Ratings

Loads	MW
ES MCC 3AB with AHF-1C	0.091
A or B heat tracing	0.041
AHF-54A or AHF-54B	0.013
AHF-17A or AHF-17B	0.050
AHF-18A or AHF-18B	0.050
AHF-19A or AHF-19B	0.017
CHP-1A or CHP-1B	0.017
CHHE-1A or CHHE-1B	0.193
SFP-1A or SFP-1B	0.041

3.0 FOLLOW-UP ACTIONS (CONT'D)

ACTIONS	DETAILS
3.10 ___ IF ES 480V UV lockout has actuated, THEN reset ES 480V lockout.	1 ___ Bypass or reset ES actuation. 2 ___ Reset ES 480V lockouts located behind the MCB. ES 480V UV Lockouts:

A	B
___8627/ESA	___8627/ESB
___86X27/ESA	

3.11 ___ IF only 1 ES 480V bus is energized, THEN ensure ES MCC 3AB is aligned to the energized ES 480V bus.	1 ___ Ensure EDG capacity to supply 0.1 MW additional load. See Tables 1, 2, and 3. 2 ___ Depress transfer pushbuttons for the ES MCC 3AB to the energized ES 480V bus.

Applicable Carry-over steps:
3.3 IF at any time, an EDG fails... 3.8 WHEN letdown flow restoration is desired, THEN Refer to Enclosure 1...

Table 1: EDG Rating

	Load range in MW
Maximum load	3.5
30 min	> 3.25 to ≤ 3.5
200 hr	> 3.0 to ≤ 3.25
2000 hr	> 2.85 to ≤ 3.0
Continuous	≤ 2.85

Table 2: EDG Loads to Shed

Loads	MW
EFP-1	0.528
SWP-1A or SWP-1B	0.486
RWP-2A or RWP-2B	0.538
AHF-1A or AHF-1B or AHF-1C	0.061

Table 3: ES 480V Load Ratings

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AHF-18A or AHF-18B	0.050
AHF-19A or AHF-19B	0.017
CHP-1A or CHP-1B	0.017
CHHE-1A or CHHE-1B	0.193
SFP-1A or SFP-1B	0.041

ACTIONS	DETAILS
3.12 ___ IF MUP restart is required, THEN start MUP, AND establish RCP seal injection. Continue on in this procedure.	1 ___ Close MUV-16 "RC PUMP TOTAL SEAL INLET FLOW VALVE" 2 ___ Close MUV-31 "PZR LEVEL CONTROL". 3 ___ Establish MUP cooling. 4 ___ Establish MUP recirc flow path. 5 ___ Start lube and gear oil pumps. 6 ___ Start ES selected MUP. 7 ___ Throttle open MUV-16 to obtain 3 gpm seal injection per RCP. 8 ___ Note the time that RCP seal injection was established _____. 9 ___ Place MUV-31 in "AUTO" at desired setpoint. 10 ___ $\geq$ 10 min after the time noted in detail 8, throttle open MUV-16 to establish 6 gpm per RCP. Note the time _____. 11 ___ $\geq$ 10 min after the time noted in detail 10, throttle open MUV-16 to establish 10 gpm per RCP.

Applicable Carry-over steps:
3.3 IF at any time, an EDG fails... 3.8 WHEN letdown flow restoration is desired, THEN Refer to Enclosure 1...

Table 1: EDG Rating

	Load range in MW
Maximum load	3.5
30 min	> 3.25 to ≤ 3.5
200 hr	> 3.0 to ≤ 3.25
2000 hr	> 2.85 to ≤ 3.0
Continuous	≤ 2.85

Table 2: EDG Loads to Shed

Loads	MW
EFP-1	0.528
SWP-1A or SWP-1B	0.486
RWP-2A or RWP-2B	0.538
AHF-1A or AHF-1B or AHF-1C	0.061

Table 3: ES 480V Load Ratings

Loads	MW
ES MCC 3AB with AHF-1C	0.091
A or B heat tracing	0.041
AHF-54A or AHF-54B	0.013
AHF-17A or AHF-17B	0.050
AHF-18A or AHF-18B	0.050
AHF-19A or AHF-19B	0.017
CHP-1A or CHP-1B	0.017
CHHE-1A or CHHE-1B	0.193
SFP-1A or SFP-1B	0.041

3.0 FOLLOW-UP ACTIONS (CONT'D)

	ACTIONS	DETAILS
3.13 ___	IF an additional MUP is required to be started, THEN ensure EDG capacity for 0.7 MW additional load exists prior to starting.	See Tables 1 and 2.

Note

The MW load value provided in step 3.14, detail 1, is for 1 train of decay heat removal including the DCP and RWP.

3.14 ___	IF RCS was on decay heat removal, AND decay heat removal restart is required, THEN verify prerequisite conditions as directed by SSOD.	1 ___ Ensure EDG capacity for 0.55 MW additional load exists prior to starting. See Tables 1 and 2. 2 ___ Refer to OP-404, Decay Heat Removal System, Section 4.7.
3.15 ___	IF SW Raw Water PRESS has not recovered, THEN start RWP-2A or RWP-2B.	To restart a pump that was running when power was interrupted: 1 ___ Ensure EDG capacity for 0.55 MW additional load exists prior to starting. See Tables 1 and 2. 2 ___ Select the control switch to the "STOP" position to reset the anti-pump device. 3 ___ Select the control switch to the "START" position.

Applicable Carry-over steps:
3.3 IF at any time, an EDG fails... 3.8 WHEN letdown flow restoration is desired, THEN Refer to Enclosure 1...

Table 1: EDG Rating

	Load range in MW
Maximum load	3.5
30 min	> 3.25 to ≤ 3.5
200 hr	> 3.0 to ≤ 3.25
2000 hr	> 2.85 to ≤ 3.0
Continuous	≤ 2.85

Table 2: EDG Loads to Shed

Loads	MW
EFP-1	0.528
SWP-1A or SWP-1B	0.486
RWP-2A or RWP-2B	0.538
AHF-1A or AHF-1B or AHF-1C	0.061

Table 3: ES 480V Load Ratings

Loads	MW
ES MCC 3AB with AHF-1C	0.091
A or B heat tracing	0.041
AHF-54A or AHF-54B	0.013
AHF-17A or AHF-17B	0.050
AHF-18A or AHF-18B	0.050
AHF-19A or AHF-19B	0.017
CHP-1A or CHP-1B	0.017
CHHE-1A or CHHE-1B	0.193
SFP-1A or SFP-1B	0.041

3.0 FOLLOW-UP ACTIONS (CONT'D)

ACTIONS	DETAILS
3.16 ___ IF SW PRESS has not recovered, THEN start SWP-1A or SWP-1B.	To restart a pump that was running when power was interrupted: 1 ___ Ensure EDG capacity for 0.5 MW additional load exists prior to starting. See Tables 1 and 2. 2 ___ Select the control switch to the "STOP" position to reset the anti-pump device. 3 ___ Select the control switch to the "START" position.
3.17 ___ Ensure RB Cooling is in service on SW cooling.	1 ___ Ensure EGDG capacity for 0.075 MW additional load exists prior to starting. See Tables 1 and 2. 2. Ensure RB cooling unit running in slow speed: ___ AHF-1A slow speed ___ AHF-1C slow speed ___ AHF-1B slow speed. 3. Ensure SW is aligned to RB cooling units: ___ Close SWV-152 ___ Close SWV-151 ___ Close SWV-355 ___ Open SWV-353 ___ Open SWV-354.

Applicable Carry-over steps:
3.3 IF at any time, an EDG fails... 3.8 WHEN letdown flow restoration is desired, THEN Refer to Enclosure 1...

Table 1: EDG Rating

	Load range in MW
Maximum load	3.5
30 min	> 3.25 to ≤ 3.5
200 hr	> 3.0 to ≤ 3.25
2000 hr	> 2.85 to ≤ 3.0
Continuous	≤ 2.85

Table 2: EDG Loads to Shed

Loads	MW
EFP-1	0.528
SWP-1A or SWP-1B	0.486
RWP-2A or RWP-2B	0.538
AHF-1A or AHF-1B or AHF-1C	0.061

Table 3: ES 480V Load Ratings

Loads	MW
ES MCC 3AB with AHF-1C	0.091
A or B heat tracing	0.041
AHF-54A or AHF-54B	0.013
AHF-17A or AHF-17B	0.050
AHF-18A or AHF-18B	0.050
AHF-19A or AHF-19B	0.017
CHP-1A or CHP-1B	0.017
CHHE-1A or CHHE-1B	0.193
SFP-1A or SFP-1B	0.041

ACTIONS	DETAILS
Note 2 PZR Htr groups are required to compensate for heat loss to ambient.	
3.18 IF all of the following conditions are met: ___ PZR Htrs are required ___ PZR Htr normal power supply is not available ___ ES 4160V Bus A is energized ___ ES 480V Bus A is energized ___ PZR Htr MCC 3A is available, THEN ensure EDG-1A capacity for 0.275 MW load AND energize 2 PZR Htr groups from 4160V ES Bus A.	See Tables 1 and 2. ___ CONCURRENTLY PERFORM Enclosure 2, Energizing PZR Htrs, IAP-1A, DPBC-1G and DPBC-1I from 4160V ES A, to energize 2 PZR Htr groups.
3.19 IF all of the following conditions are met: ___ PZR Htrs are required ___ PZR Htr normal power supply is not available ___ ES 4160V Bus B is energized ___ ES 480V Bus B is energized ___ PZR Htr MCC 3A is not available, THEN ensure EDG-1B capacity for 0.275 MW load AND energize 2 PZR Htr groups from 4160V ES Bus B.	See Tables 1 and 2. ___ CONCURRENTLY PERFORM Enclosure 3, Energizing PZR Htrs, IAP-1B, DPBC-1H and DPBC-1I from 4160V ES B, to energize 2 PZR Htr groups.

Applicable Carry-over steps:
3.3 IF at any time, an EDG fails... 3.8 WHEN letdown flow restoration is desired, THEN Refer to Enclosure 1...

Table 1: EDG Rating

	Load range in MW
Maximum load	3.5
30 min	> 3.25 to ≤ 3.5
200 hr	> 3.0 to ≤ 3.25
2000 hr	> 2.85 to ≤ 3.0
Continuous	≤ 2.85

Table 2: EDG Loads to Shed

Loads	MW
EFP-1	0.528
SWP-1A or SWP-1B	0.486
RWP-2A or RWP-2B	0.538
AHF-1A or AHF-1B or AHF-1C	0.061

Table 3: ES 480V Load Ratings

Loads	MW
ES MCC 3AB with AHF-1C	0.091
A or B heat tracing	0.041
AHF-54A or AHF-54B	0.013
AHF-17A or AHF-17B	0.050
AHF-18A or AHF-18B	0.050
AHF-19A or AHF-19B	0.017
CHP-1A or CHP-1B	0.017
CHHE-1A or CHHE-1B	0.193
SFP-1A or SFP-1B	0.041

3.0 FOLLOW-UP ACTIONS (CONT'D)

ACTIONS	DETAILS
3.20 ___ IF an outside air compressor is available, THEN notify SPO to start SAP-1C or SAP-1D.	
3.21 ___ IF SAP-1C and SAP-1D are not available, THEN notify SPO to start diesel air compressor if available.	
3.22 ___ IF no outside air compressors are available, AND EGDG capacity for 0.075 MW additional load exists, THEN energize and start IAP-1A or IAP-1B.	See Tables 1 and 2. ___ CONCURRENTLY PERFORM Enclosure 2, Energizing PZR Htrs, IAP-1A, DPBC-1G and DPBC-1I from 4160V ES A, to place IAP-1A in service. ___ CONCURRENTLY PERFORM Enclosure 3, Energizing PZR Htrs, IAP-1B, DPBC-1H and DPBC-1I from 4160V ES B, to place IAP-1B in service.

Applicable Carry-over steps:
3.3 IF at any time, an EDG fails... 3.8 WHEN letdown flow restoration is desired, THEN Refer to Enclosure 1...

Table 1: EDG Rating

	Load range in MW
Maximum load	3.5
30 min	> 3.25 to ≤ 3.5
200 hr	> 3.0 to ≤ 3.25
2000 hr	> 2.85 to ≤ 3.0
Continuous	≤ 2.85

Table 2: EDG Loads to Shed

Loads	MW
EFP-1	0.528
SWP-1A or SWP-1B	0.486
RWP-2A or RWP-2B	0.538
AHF-1A or AHF-1B or AHF-1C	0.061

Table 3: ES 480V Load Ratings

Loads	MW
ES MCC 3AB with AHF-1C	0.091
A or B heat tracing	0.041
AHF-54A or AHF-54B	0.013
AHF-17A or AHF-17B	0.050
AHF-18A or AHF-18B	0.050
AHF-19A or AHF-19B	0.017
CHP-1A or CHP-1B	0.017
CHHE-1A or CHHE-1B	0.193
SFP-1A or SFP-1B	0.041

3.0 FOLLOW-UP ACTIONS (CONT'D)

ACTIONS	DETAILS
3.23 ___ Start CC ventilation.	1 ___ Ensure EGDG capacity for 0.3 MW additional load exists prior to starting. See Tables 1, 2, and 3. 2 ___ Start normal CC ventilation. Refer to OP-409, Plant Ventilation, Section 4.2. 3 ___ Start CC chiller. Refer to OP-409, Plant Ventilation, Section 4.10. IF CC chillers are NOT available, THEN refer to OP-409, Plant Ventilation, Section 4.3 for Appendix R chillers, OR refer to MP-193, Temporary Cooling to Control Complex.
3.24 ___ IF DPBA-1C battery charge is desired, AND EGDG capacity for 0.175 MW additional load exists, THEN energize and charge DPBA-1C battery.	See Tables 1 and 2. ___ CONCURRENTLY PERFORM Enclosure 2, Energizing PZR Htrs, IAP-1A, DPBC-1G and DPBC-1I from 4160V ES A, to charge DPBA-1C from ES 4160V A. ___ CONCURRENTLY PERFORM Enclosure 3, Energizing PZR Htrs, IAP-1B, DPBC-1H and DPBC-1I from 4160V ES B, to charge DPBA-1C from ES 4160V B.

Applicable Carry-over steps:
3.3 IF at any time, an EDG fails... 3.8 WHEN letdown flow restoration is desired, THEN Refer to Enclosure 1...

Table 1: EDG Rating

	Load range in MW
Maximum load	3.5
30 min	> 3.25 to ≤ 3.5
200 hr	> 3.0 to ≤ 3.25
2000 hr	> 2.85 to ≤ 3.0
Continuous	≤ 2.85

Table 2: EDG Loads to Shed

Loads	MW
EFP-1	0.528
SWP-1A or SWP-1B	0.486
RWP-2A or RWP-2B	0.538
AHF-1A or AHF-1B or AHF-1C	0.061

Table 3: ES 480V Load Ratings

Loads	MW
ES MCC 3AB with AHF-1C	0.091
A or B heat tracing	0.041
AHF-54A or AHF-54B	0.013
AHF-17A or AHF-17B	0.050
AHF-18A or AHF-18B	0.050
AHF-19A or AHF-19B	0.017
CHP-1A or CHP-1B	0.017
CHHE-1A or CHHE-1B	0.193
SFP-1A or SFP-1B	0.041

3.0 FOLLOW-UP ACTIONS (CONT'D)

	ACTIONS	DETAILS
3.25 ___	IF heat tracing is desired, AND EGDG capacity for 0.05 MW additional load exists, THEN restore heat tracing.	See Tables 1, 2, and 3. ___ Reset heat tracing at: o HTCP-5, A heat trace panel near ES MCC-3A2, 119 ft AB o HTCP-2, B heat trace panel near elevator, 95 ft AB.
3.26 ___	IF offsite power from the 230 KV switchyard cannot be restored in a timely manner, AND the 500 KV switchyard is available, THEN establish backfeed to the Aux transformer. Continue on in this procedure.	Refer to OP-703A, Establishing And Removing 500 KV Electrical Power Backfeed.
3.27 ___	IF offsite power will not be available for restoration within 2 hours, THEN verify EDG loading is within fuel oil consumption limits and that fuel oil reserves are adequate.	___ IF both EDGs are running, THEN notify the SSOD to: o Order diesel fuel oil for emergency delivery within the next 10 hours o Reduce and maintain combined EDG loads to $\leq$ 2.33 MW within the next 10 hours.

Applicable Carry-over steps:
3.3 IF at any time, an EDG fails... 3.8 WHEN letdown flow restoration is desired, THEN Refer to Enclosure 1...

Table 1: EDG Rating

	Load range in MW
Maximum load	3.5
30 min	> 3.25 to ≤ 3.5
200 hr	> 3.0 to ≤ 3.25
2000 hr	> 2.85 to ≤ 3.0
Continuous	≤ 2.85

Table 2: EDG Loads to Shed

Loads	MW
EFP-1	0.528
SWP-1A or SWP-1B	0.486
RWP-2A or RWP-2B	0.538
AHF-1A or AHF-1B or AHF-1C	0.061

Table 3: ES 480V Load Ratings

Loads	MW
ES MCC 3AB with AHF-1C	0.091
A or B heat tracing	0.041
AHF-54A or AHF-54B	0.013
AHF-17A or AHF-17B	0.050
AHF-18A or AHF-18B	0.050
AHF-19A or AHF-19B	0.017
CHP-1A or CHP-1B	0.017
CHHE-1A or CHHE-1B	0.193
SFP-1A or SFP-1B	0.041

ACTIONS	DETAILS

****

CAUTION

When operating an EDG in parallel with the Aux Transformer, avoid starting or stopping major loads fed from the transformer in order to prevent voltage fluctuations which could cause tripping of the EDG output Bkr and loss of bus voltage.

****

Note

Plant should be in a stable condition prior to paralleling to EDG.

3.28 ___ WHEN offsite power is available to ES 4160V busses, THEN sync in offsite power supply and unload EDG.

1 ___ Ensure HPI is bypassed or reset.

2 ___ Depress the "4160V ES A or B UV RESET" pushbutton.

3 ___ Notify PPO to select EDG "SPEED DROOP" to 60 in increments of 10.

4 ___ Notify PPO to select EDG Unit Parallel switch to "PARALLEL".

5 ___ Select synchroscope for Bkr to be paralleled to "ON".

6 ___ Select "EXC VOLT ADJ SELECT" switch to "CONT RM".

7 ___ Match voltages using "EXC VOLT ADJ DIESEL GEN".

8 ___ Adjust "GEN SPEED" to establish synchroscope moving slowly in the "SLOW" direction, counter-clockwise.

9 ___ Close oncoming Bkr at ≈ 1 o'clock.

10 ___ Refer to OP-707, Operation of the ES Emergency Diesel Generators, Section 4.13, for ES restoration.

Applicable Carry-over steps:
3.8 WHEN letdown flow restoration is desired, THEN Refer to Enclosure 1...

Table 1: EDG Rating

	Load range in MW
Maximum load	3.5
30 min	> 3.25 to ≤ 3.5
200 hr	> 3.0 to ≤ 3.25
2000 hr	> 2.85 to ≤ 3.0
Continuous	≤ 2.85

Table 2: EDG Loads to Shed

Loads	MW
EFP-1	0.528
SWP-1A or SWP-1B	0.486
RWP-2A or RWP-2B	0.538
AHF-1A or AHF-1B or AHF-1C	0.061

Table 3: ES 480V Load Ratings

Loads	MW
ES MCC 3AB with AHF-1C	0.091
A or B heat tracing	0.041
AHF-54A or AHF-54B	0.013
AHF-17A or AHF-17B	0.050
AHF-18A or AHF-18B	0.050
AHF-19A or AHF-19B	0.017
CHP-1A or CHP-1B	0.017
CHHE-1A or CHHE-1B	0.193
SFP-1A or SFP-1B	0.041

3.0 FOLLOW-UP ACTIONS (CONT'D)

ACTIONS	DETAILS

****

CAUTION

When operating an EDG in parallel with the Aux Transformer, avoid starting or stopping major loads fed from the transformer in order to prevent voltage fluctuations which could cause tripping of the EDG output Bkr and loss of bus voltage.

****

3.29 ___	WHEN offsite power is available to Unit 4160V buses, THEN energize unit buses.	Refer to OP-703, Plant Distribution System, Section 4.1, to energize unit buses.

3.30 ___	Exit this procedure. GO TO applicable operating procedures.	Applicable operating procedures to be determined by plant conditions and SSOD.

Table 1: EDG Rating

	Load range in MW
Maximum load	3.5
30 min	> 3.25 to ≤ 3.5
200 hr	> 3.0 to ≤ 3.25
2000 hr	> 2.85 to ≤ 3.0
Continuous	≤ 2.85

Table 2: EDG Loads to Shed

Loads	MW
EFP-1	0.528
SWP-1A or SWP-1B	0.486
RWP-2A or RWP-2B	0.538
AHF-1A or AHF-1B or AHF-1C	0.061

Table 3: ES 480V Load Ratings

Loads	MW
ES MCC 3AB with AHF-1C	0.091
A or B heat tracing	0.041
AHF-54A or AHF-54B	0.013
AHF-17A or AHF-17B	0.050
AHF-18A or AHF-18B	0.050
AHF-19A or AHF-19B	0.017
CHP-1A or CHP-1B	0.017
CHHE-1A or CHHE-1B	0.193
SFP-1A or SFP-1B	0.041

ENCLOSURE 1
RC Letdown Recovery.

ACTIONS		DETAILS
1	___ Ensure letdown is isolated.	___ Close MUV-49 "LETDN CLR ISO". ___ Close MUV-50 "BLK ORIFICE ISO". ___ Close MUV-51 "LETDOWN FLOW".
2	___ Ensure SW and MU valves open for desired letdown coolers.	o MUHE-1A: ___ Open SWV-47 ___ Open SWV-50 ___ Open MUV-38 ___ Open MUV-40. o MUHE-1B: ___ Open SWV-48 ___ Open SWV-49 ___ Open MUV-39 ___ Open MUV-41. o MUHE-1C: ___ Open SWV-47 ___ Open SWV-50 ___ Open MUV-498 ___ Open MUV-505.
3	___ Establish a flow path for letdown.	___ Ensure 1 Pre-filter in service or bypassed. ___ Ensure MU demins are bypassed. ___ Ensure 1 Post-filter in service or bypassed.

Table 1: EDG Rating

	Load range in MW
Maximum load	3.5
30 min	> 3.25 to ≤ 3.5
200 hr	> 3.0 to ≤ 3.25
2000 hr	> 2.85 to ≤ 3.0
Continuous	≤ 2.85

Table 2: EDG Loads to Shed

Loads	MW
EFP-1	0.528
SWP-1A or SWP-1B	0.486
RWP-2A or RWP-2B	0.538
AHF-1A or AHF-1B or AHF-1C	0.061

Table 3: ES 480V Load Ratings

Loads	MW
ES MCC 3AB with AHF-1C	0.091
A or B heat tracing	0.041
AHF-54A or AHF-54B	0.013
AHF-17A or AHF-17B	0.050
AHF-18A or AHF-18B	0.050
AHF-19A or AHF-19B	0.017
CHP-1A or CHP-1B	0.017
CHHE-1A or CHHE-1B	0.193
SFP-1A or SFP-1B	0.041

RC Letdown Recovery.

ACTIONS	DETAILS
4 ___ Start letdown flow.	1 ___ Open MUV-49. 2 ___ Throttle open MUV-51 to establish 2 to 3 gpm each minute for 20 minutes. 3 ___ Allow letdown TEMP to stabilize for ≥ 10 minutes.
5 ___ Open MUV-50.	
6 ___ Throttle MUV-51 to establish desired letdown flow.	

Table 1: EDG Rating

	Load range in MW
Maximum load	3.5
30 min	> 3.25 to ≤ 3.5
200 hr	> 3.0 to ≤ 3.25
2000 hr	> 2.85 to ≤ 3.0
Continuous	≤ 2.85

Table 2: EDG Loads to Shed

Loads	MW
EFP-1	0.528
SWP-1A or SWP-1B	0.486
RWP-2A or RWP-2B	0.538
AHF-1A or AHF-1B or AHF-1C	0.061

Table 3: ES 480V Load Ratings

Loads	MW
ES MCC 3AB with AHF-1C	0.091
A or B heat tracing	0.041
AHF-54A or AHF-54B	0.013
AHF-17A or AHF-17B	0.050
AHF-18A or AHF-18B	0.050
AHF-19A or AHF-19B	0.017
CHP-1A or CHP-1B	0.017
CHHE-1A or CHHE-1B	0.193
SFP-1A or SFP-1B	0.041

Enclosure 2

Energizing PZR Htrs, IAP-1A, DPBC-1G and DPBC-1I from 4160V ES A

	ACTIONS	DETAILS
	Note Action steps 1 through 5 establish power feeds for this Enclosure and only need to be performed once.	
1 ___	Ensure 480V Rx Aux Bus 3A feeder Bkrs are open.	___ Ensure open: o Bkr 3305 o Bkr 3395.
2 ___	Notify SPO to ensure open all Bkrs on 480V Rx Aux Bus 3A and PZR Htr MCC 3A.	___ All Bkrs open on: o 480V Rx Aux Bus 3A o PZR Htr MCC 3A.
3 ___	Place IAP-1A control switch in "PULL TO LOCK".	
4 ___	Energize 480V Rx Aux Bus 3A.	___ Close the following Bkrs: o Bkr 3321 o Bkr 3395.
5 ___	Energize PZR Htr MCC 3A.	Notify SPO to close Bkr 3355, Unit 1C, on Rx Aux Bus 3A.

Table 1: EDG Rating

	Load range in MW
Maximum load	3.5
30 min	> 3.25 to ≤ 3.5
200 hr	> 3.0 to ≤ 3.25
2000 hr	> 2.85 to ≤ 3.0
Continuous	≤ 2.85

Table 2: EDG Loads to Shed

Loads	MW
EFP-1	0.528
SWP-1A or SWP-1B	0.486
RWP-2A or RWP-2B	0.538
AHF-1A or AHF-1B or AHF-1C	0.061

Table 3: ES 480V Load Ratings

Loads	MW
ES MCC 3AB with AHF-1C	0.091
A or B heat tracing	0.041
AHF-54A or AHF-54B	0.013
AHF-17A or AHF-17B	0.050
AHF-18A or AHF-18B	0.050
AHF-19A or AHF-19B	0.017
CHP-1A or CHP-1B	0.017
CHHE-1A or CHHE-1B	0.193
SFP-1A or SFP-1B	0.041

Energizing PZR Htrs, IAP-1A, DPBC-1G and DPBC-1I from 4160V ES A

ACTIONS	DETAILS
6 ___ IF PZR Htrs are required, THEN energize PZR control power and energize 2 groups of Htrs.	1 ___ Ensure EGDG-1A capacity is available for 0.275 MW. See Tables 1 and 2. 2 ___ Notify SPO to close the following Bkrs at PZR Htr MCC 3A: o Unit 1A "PRESS HTR CONTROL TRANSFORMER A-1" o Unit 2A "PRESS HTR CONTROL TRANSFORMER A-2". 3. Notify SPO to close 2 of the following Bkrs at PZR Htr MCC 3A: ___ Unit 4A "PRESS. HEATERS S.C.R. GROUP 1" ___ Unit 1C "PRESS. HEATERS GROUP 7" ___ Unit 2C "PRESS. HEATERS GROUP 8" ___ Unit 3C "PRESS. HEATERS GROUP 9".
7 ___ IF IAP-1A is required, THEN establish IAP-1A cooling from SW system and start IAP-1A.	1 ___ Ensure EGDG-1A capacity is available for 0.075 MW. See Tables 1 and 2. 2 ___ Notify SPO to line up SW cooling for IAP-1A. Refer to OP-408, Nuclear Services Cooling System, Section 4.6. 3 ___ Start IAP-1A.

Table 1: EDG Rating

	Load range in MW
Maximum load	3.5
30 min	> 3.25 to ≤ 3.5
200 hr	> 3.0 to ≤ 3.25
2000 hr	> 2.85 to ≤ 3.0
Continuous	≤ 2.85

Table 2: EDG Loads to Shed

Loads	MW
EFP-1	0.528
SWP-1A or SWP-1B	0.486
RWP-2A or RWP-2B	0.538
AHF-1A or AHF-1B or AHF-1C	0.061

Table 3: ES 480V Load Ratings

Loads	MW
ES MCC 3AB with AHF-1C	0.091
A or B heat tracing	0.041
AHF-54A or AHF-54B	0.013
AHF-17A or AHF-17B	0.050
AHF-18A or AHF-18B	0.050
AHF-19A or AHF-19B	0.017
CHP-1A or CHP-1B	0.017
CHHE-1A or CHHE-1B	0.193
SFP-1A or SFP-1B	0.041

Energizing PZR Htrs, IAP-1A, DPBC-1G and DPBC-1I from 4160V ES A

ACTIONS	DETAILS
8 ___ IF DPBA-1C recharge is required, THEN place DPBA-1C on charge.	1 ___ Ensure EGDG-1A capacity is available for 0.175 MW. See Tables 1 and 2. 2 ___ Notify SPO to open DPDP-1C switch 13. 3 ___ Notify SPO to close the following switches: o DPDP-1C switch 4 o DPDP-1C switch 14. 4 ___ Notify SPO to select DPXS-1C to the "POWER FROM PZR HTR MCC 3A" "ON" position. 5 ___ Notify SPO to close PZR Htr MCC 3A Bkrs: o Unit 3A "BATTERY CHGR DPBC-1G" o Unit 3B "BATT CHGR DPBC-1I VIA DPXS-1C".

Table 1: EDG Rating

	Load range in MW
Maximum load	3.5
30 min	> 3.25 to ≤ 3.5
200 hr	> 3.0 to ≤ 3.25
2000 hr	> 2.85 to ≤ 3.0
Continuous	≤ 2.85

Table 2: EDG Loads to Shed

Loads	MW
EFP-1	0.528
SWP-1A or SWP-1B	0.486
RWP-2A or RWP-2B	0.538
AHF-1A or AHF-1B or AHF-1C	0.061

Table 3: ES 480V Load Ratings

Loads	MW
ES MCC 3AB with AHF-1C	0.091
A or B heat tracing	0.041
AHF-54A or AHF-54B	0.013
AHF-17A or AHF-17B	0.050
AHF-18A or AHF-18B	0.050
AHF-19A or AHF-19B	0.017
CHP-1A or CHP-1B	0.017
CHHE-1A or CHHE-1B	0.193
SFP-1A or SFP-1b	0.041

Enclosure 3

Energizing PZR Htrs, IAP-1B, DPBC-1H and DPBC-1I from 4160V ES B

ACTIONS	DETAILS

Note

Action steps 1 through 6 establish power feeds for this Enclosure and only need to be performed once.

1 ___ Ensure the listed 480V feeder and tie Bkrs are open.

Ensure open:

___ Bkr 3392 Plant Aux tie

___ Bkr 3312 Plant Aux feeder

___ Bkr 3306 Rx Aux 3B feeder

___ Bkr 3396 Rx Aux 3B tie

___ Bkr 3393 Turb Aux 3A tie

___ Bkr 3394 Turb Aux 3B tie

___ Bkr 3399 Heating Aux tie.

2 ___ Notify SPO to ensure open all Bkrs on 480V Plant Aux Bus, 480V Rx Aux Bus 3B, and PZR Htr MCC 3B.

All Bkrs open on:

___ 480V Plant Aux Bus

___ 480V Rx Aux Bus 3B

___ PZR Htr MCC 3B.

3 ___ Place IAP-1B control switch in "PULL TO LOCK".

Table 1: EDG Rating

	Load range in MW
Maximum load	3.5
30 min	> 3.25 to ≤ 3.5
200 hr	> 3.0 to ≤ 3.25
2000 hr	> 2.85 to ≤ 3.0
Continuous	≤ 2.85

Table 2: EDG Loads to Shed

Loads	MW
EFP-1	0.528
SWP-1A or SWP-1B	0.486
RWP-2A or RWP-2B	0.538
AHF-1A or AHF-1B or AHF-1C	0.061

Table 3: ES 480V Load Ratings

Loads	MW
ES MCC 3AB with AHF-1C	0.091
A or B heat tracing	0.041
AHF-54A or AHF-54B	0.013
AHF-17A or AHF-17B	0.050
AHF-18A or AHF-18B	0.050
AHF-19A or AHF-19B	0.017
CHP-1A or CHP-1B	0.017
CHHE-1A or CHHE-1B	0.193
SFP-1A or SFP-1B	0.041

Energizing PZR Htrs, IAP-1B, DPBC-1H and DPBC-1I from 4160V ES B

	ACTIONS	DETAILS
4 ___	Energize 480V Plant Aux Bus.	___ Close the following Bkrs: o Bkr 3222 o Bkr 3312.
5 ___	Energize 480V Rx Aux Bus 3B.	___ Close the following Bkrs: o Bkr 3392 o Bkr 3396.
6 ___	Energize PZR Htr MCC 3B.	Notify SPO to close Bkr 3356, Unit 1C, on Rx Aux Bus 3B.

Table 1: EDG Rating

	Load range in MW
Maximum load	3.5
30 min	> 3.25 to ≤ 3.5
200 hr	> 3.0 to ≤ 3.25
2000 hr	> 2.85 to ≤ 3.0
Continuous	≤ 2.85

Table 2: EDG Loads to Shed

Loads	MW
EFP-1	0.528
SWP-1A or SWP-1B	0.486
RWP-2A or RWP-2B	0.538
AHF-1A or AHF-1B or AHF-1C	0.061

Table 3: ES 480V Load Ratings

Loads	MW
ES MCC 3AB with AHF-1C	0.091
A or B heat tracing	0.041
AHF-54A or AHF-54B	0.013
AHF-17A or AHF-17B	0.050
AHF-18A or AHF-18B	0.050
AHF-19A or AHF-19B	0.017
CHP-1A or CHP-1B	0.017
CHHE-1A or CHHE-1B	0.193
SFP-1A or SFP-1B	0.041

Energizing PZR Htrs, IAP-1B, DPBC-1H and DPBC-1I from 4160V ES B

ACTIONS	DETAILS
7 ___ IF PZR Htrs are required, THEN energize PZR control power and energize 2 groups of Htrs.	1 ___ Ensure EGDG-1B capacity is available for 0.275 MW. See Tables 1 and 2. 2 ___ Notify SPO to close the following Bkrs at PZR Htr MCC 3B: o Unit 1A "PRESS HTR CONTROL TRANSFORMER B-1" o Unit 1B "PRESS HTR CONTROL TRANSFORMER B-2". 3. Notify SPO to close 2 of the following Bkrs at PZR Htr MCC 3B: ___ Unit 2A "PRESS HTRS SCR GROUP 2" ___ Unit 3A "PRESS HTRS SCR GROUP 5" ___ Unit 4A "PRESS HTRS SCR GROUP 6" ___ Unit 1D "PRESS HTRS GROUP 10" ___ Unit 2C "PRESS HTRS GROUP 11" ___ Unit 3C "PRESS HTRS GROUP 12" ___ Unit 4C "PRESS HTRS GROUP 13".

Table 1: EDG Rating

	Load range in MW
Maximum load	3.5
30 min	> 3.25 to ≤ 3.5
200 hr	> 3.0 to ≤ 3.25
2000 hr	> 2.85 to ≤ 3.0
Continuous	≤ 2.85

Table 2: EDG Loads to Shed

Loads	MW
EFP-1	0.528
SWP-1A or SWP-1B	0.486
RWP-2A or RWP-2B	0.538
AHF-1A or AHF-1B or AHF-1C	0.061

Table 3: ES 480V Load Ratings

Loads	MW
ES MCC 3AB with AHF-1C	0.091
A or B heat tracing	0.041
AHF-54A or AHF-54B	0.013
AHF-17A or AHF-17B	0.050
AHF-18A or AHF-18B	0.050
AHF-19A or AHF-19B	0.017
CHP-1A or CHP-1B	0.017
CHHE-1A or CHHE-1B	0.193
SFP-1A or SFP-1B	0.041

Energizing PZR Htrs, IAP-1B, DPBC-1H and DPBC-1I from 4160V ES B

ACTIONS	DETAILS
8 ___ IF IAP-1B is required, THEN establish IAP-1B cooling from SW system and start IAP-1B.	1 ___ Ensure EGDG-1B capacity is available for 0.075 MW. See Tables 1 and 2. 2 ___ Notify SPO to line up SW cooling for IAP-1B. Refer to OP-408, Nuclear Services Cooling System, Section 4.6. 3 ___ Start IAP-1B.
9 ___ IF DPBA-1C recharge is required, THEN place DPBA-1C on charge.	1 ___ Ensure EGDG-1B capacity is available for 0.160 MW. See Tables 1 and 2. 2 ___ Notify SPO to open DPDP-1C switch 14. 3 ___ Notify SPO to close the following switches: o DPDP-1C switch 5 o DPDP-1C switch 13. 4 ___ Notify SPO to select DPXS-1C to the "POWER FROM PZR HTR MCC 3B" "ON" position. 5 ___ Notify SPO to close PZR Htr MCC 3B Bkrs: o Unit 3BL "BATTERY CHGR DPBC-1H" o Unit 3BR "BATT CHGR DPBC-1I VIA DPXS-1C".

REFUELING CANAL LEVEL DECREASE

1.0 ENTRY CONDITIONS

IF unexpected decrease in refueling canal water level occurs,

THEN use this procedure.

2.0 IMMEDIATE ACTIONS

Note

There are no immediate actions in this procedure.

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3.0 FOLLOW-UP ACTIONS

ACTIONS	DETAILS
3.1 ___ Notify personnel of plant conditions as required.	___ Plant operators ___ SOTA ___ Health Physics to survey for high radiation levels ___ SSOD to evaluate plant conditions for entry into the emergency plan.

3.2 ___ IF irradiated fuel is suspended from bridge, THEN notify bridge operator to place fuel in Rx vessel.

IF fuel can NOT be placed in the Rx vessel, THEN place fuel in upender and lower.

3.3 ___ IF irradiated components are suspended from crane, AND in the canal, THEN notify crane operator to place component in deep end.

IF component can NOT be placed in the deep end, THEN suspend component inside Rx vessel above fuel.

3.4 ___ IF irradiated fuel is suspended from spent fuel handling bridge, THEN notify bridge operator to place fuel in any available spent fuel rack location.

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3.0 FOLLOW-UP ACTIONS (CONT'D)

ACTIONS	DETAILS
3.5 ___ IF it becomes apparent that the water level is decreasing faster than the fuel can be lowered, THEN leave the bridge, AND evacuate the area immediately.	

Note

IF fuel transfer tubes are open, THEN RB PRESS can affect fuel transfer canal level.

3.6 ___ Attempt to determine and correct source of leak.	Visually inspect if possible: o RB sump area o Seal plate. Observe levels in: ___ AB sump ___ RB sump ___ Refueling canal level ___ BWST level ___ SF pool levels ___ RCS level trends ___ SW surge tank level trends. Ensure closed Fuel Transfer Canal deep end drains to the RB sump: ___ SFV-83 ___ SFV-84
3.7 ___ IF leak is in the RB, OR leak cannot be stopped, THEN evacuate the RB.	1 ___ Depress "RB EVACUATION" pushbutton. 2 ___ Notify personnel over PA. 3 ___ Depress "RB EVACUATION" pushbutton. 4 ___ Repeat PA announcement.

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3.0 FOLLOW-UP ACTIONS (CONT'D)

ACTIONS	DETAILS
3.8 ___ IF the leak is in the RB, AND cannot be isolated, THEN place the RB sump pumps in "PULL TO LOCK".	o WDP-2A o WDP-2B
3.9 ___ IF RCS level is not known, THEN observe DHPs for cavitation.	Signs of cavitation are: o Erratic DHP amperage o Erratic DHP flow o High DHP vibration.
3.10 ___ IF DHP cavitation exists, THEN stop the DHP. AND CONCURRENTLY PERFORM EOP-11, Loss of Decay Heat Removal, beginning with Step 3.1	
3.11 ___ Stop the Spent Fuel Pumps.	Stop the following pumps: o SFP-1A o SFP-1B o SFP-2.
3.12 ___ Stop the RB purge.	Close the following valves: ___ AHV-1A ___ AHV-1B ___ AHV-1C ___ AHV-1D. Stop the following fans: ___ AHF-6A ___ AHF-6B ___ AHF-7A ___ AHF-7B.

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3.0 FOLLOW-UP ACTIONS (CONT'D)

ACTIONS	DETAILS
Note Fuel transfer tube valves may not be able to be fully closed due to carriage cables.	
3.13 ___ Notify AB operator to close fuel transfer tube valves as far as possible.	Close: o SFV-119 o SFV-120.
3.14 ___ Evacuate AB if required.	1. Determine evacuation requirements based on the following: ___ Health Physics survey ___ Local area radiation monitors ___ AB atmospheric radiation monitors. 2. IF evacuation is required, THEN: ___ Depress "AB EVACUATION" pushbutton ___ Notify plant personnel over PA. ___ Depress "AB EVACUATION" pushbutton ___ Repeat PA Announcement.

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3.0 FOLLOW-UP ACTIONS (CONT'D)

ACTIONS		DETAILS
3.15	___ Establish makeup to fuel transfer canal from available borated water sources.	o BWST refer to OP-406 o RCBT refer to OP-402

Note

Leakage from SF suction and discharge piping will stop when level decreases to approximately four feet below normal level.

3.16	___ IF SF is determined to be the source of the leakage, THEN attempt to isolate the leak.	o IF leakage is isolable, THEN isolate the leak. o IF leakage is from piping and is unisolable, THEN consider pumping the volume above affected piping to the BWST if space exists. Refer to OP-406.

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3.0 FOLLOW-UP ACTIONS (CONT'D)

ACTIONS	DETAILS
3.17 ___ Check for SF Pool liner leakage and Transfer Tube leakage.	Check SF pool liner telltale drains in MUP cubicles and Transfer Tube telltale drains under stairs by SFP air handlers. IF any drains are flowing, THEN note the valve number, AND close all telltale drain valves.

****

CAUTION

If level is not restored to allow cooling, the SP pool may reach the boiling point in as little as 8 hours and require up to 70 gpm water flow to the pool to maintain level.

****

3.18 ___ IF SF was determined to be the source of the leakage, THEN maintain SF water level.	IF the leak is unisolable, THEN maintain level just below the affected SF piping elevation until repairs are complete. Consider using the following sources as make up to the SF pool: o BWST refer to OP-406 o Batch add from BASTS refer to OP-403B o Demin. water. o Fire service hose.

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3.0 FOLLOW-UP ACTIONS (CONT'D)

ACTIONS	DETAILS
3.19 ___ WHEN the leak has been isolated or repaired, THEN restore SF pool level per OP-406.	
3.20 ___ IF leak can NOT be isolated, AND level continues to lower, THEN determine proper course of action.	Base course of action on: o Availability of incores o Location of leak o Spent fuel location o Availability of equipment. Possible actions: o Maintain DH removal o Establish LPI cooling o Establish LPI cooling from RB sump o Establish HPI cooling o Allow level to lower.

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A045 01

Rev. 21

Effective Date 5/24/94

EMERGENCY PLAN IMPLEMENTING PROCEDURE

EM-307

FLORIDA POWER CORPORATION

CRYSTAL RIVER UNIT 3

SAMPLING AND ANALYSIS OF THE REACTOR COOLANT SYSTEM, THE REACTOR BUILDING SUMP, AND THE MISCELLANEOUS WASTE STORAGE TANK UNDER ACCIDENT CONDITIONS

THIS PROCEDURE ADDRESSES NON-SAFETY RELATED COMPONENTS

APPROVED BY: Interpretation Contact

Rudy Pinner for Tom Lehnert

DATE: 5/19/94

INTERPRETATION CONTACT: Nuclear Chemistry Manager

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1.0 PURPOSE

1.1 The purpose of this procedure is to describe the actions taken to sample and analyze the Reactor Coolant System (RCS) under accident conditions for radioisotopes up to 10 Ci/cc, dissolved hydrogen concentrations from 0 to 2000 cc/Kg, boron concentrations from 0 to 6000 ppm, chloride concentrations from 0.020 to 20.00 ppm (greater concentrations can be measured using appropriate calibration standards), and pH in the range of 1.0 to 14.0.

2.0 REFERENCES

2.1 IMPLEMENTING REFERENCES

2.1.1 EM-209, Re-Entry Procedure

2.1.2 Drawings FD-302-700.

2.1.3 CH-194, Chemical Analysis with the Dionex Ion Chromatograph

2.1.4 Maintenance And Calibration Of The Orbisphere Post Accident Sampling System Hydrogen Analyzer, Section 1, Countroom Instrument Logbook.

2.1.5 Maintenance And Calibration Of The Leeds And Northrup High Purity Water pH Analyzer, Section 2, Countroom Instrument Logbook.

2.1.6 Maintenance And Calibration Of The ABB/CE Boronometer, Section 3, Countroom Instrument Logbook.

2.2 DEVELOPMENTAL REFERENCES

2.2.1 NUREG 0737

2.2.2 PASS Users Manual, Crystal River Installation

2.2.3 FD-302-700, Post Accident Sampling System Flow Diagram

2.2.4 Pass Manuals, Volume One through Nine

2.2.5 APEX Technologies Post Accident Sample System Modules Manual, FPC controlled Manual #2034

2.2.6 6059-S-002, APEX Technologies PASS Process Flow Diagram

3.0 PERSONNEL INDOCTRINATION

3.1 DESCRIPTION

3.1.1 The Post Accident Sampling System is an on-line system designed to sample and analyze reactor coolant for radioisotopes, chloride concentration, dissolved hydrogen, boron, and pH during an accident. It also allows for boron and radioisotopic analysis on the Decay Heat system, MWST, and RB Sump under accident situations.

3.1.2 The major components of the PASS include:

- The PASS Analyzer Panels with solenoid valve controls and position indicators, pressure indicators, and flow indicators.
- Modules including Liquid Calibration Module, Hydrogen Calibration Module, CAV-484 Module, Boron Analyzer Module, Dissolved Hydrogen and pH Module, Drain Tank Module, and The Waste Pumping Module. These modules contain tubing and valves used to direct samples and calibration solutions to the instrumentation used to perform the various analyses.
- The Hydrogen Analyzer, consists of two sensors capable of measuring dissolved hydrogen concentrations from 0 to 2000 cc/kg. The low range hydrogen sensor measures hydrogen concentrations in the 0 to 200 cc/kg. The high range hydrogen sensor measures hydrogen concentrations in the 200 to 2000 cc/kg range. These sensors are housed in The Dissolved Hydrogen and pH Module. Under normal and accident conditions, flow will be routed through both hydrogen sensors. The Orbisphere computer automatically selects the proper sensor input based on sample fluid hydrogen levels.
- The high purity water pH sensor/analyzer is capable of measuring pH in the ranges from .01 to 14.0. The pH sensor is located in The Dissolved Hydrogen and pH Module.
- The High Radiation Boronometer used for boron analysis, capable of detecting boron concentrations from 0 to 6000 ppm.
- Two remotely operated Sentry VREL pressure reducing elements, CAV-484 and CAV-631 provide pressure reduction and flow control of liquid samples through the Boronometer, Hydrogen sensors, and pH sensors respectively. Depending on system conditions, these valves can be used alone for flow control or in combination with a downstream pressure regulating valve and flow control valve.
- The Ion Chromatograph used for chloride analysis, is capable of measuring 0.005 ppm to 20.0 ppm. Greater concentrations can be measured using appropriate calibration standards.

- o The VAX Workstation or MicroVax 3100 Computer and associated terminal.

- o The Automatic Isotopic Measurement System (AIMS) cabinet containing an Intrinsic High Purity Germanium Planar Detector, capable of measuring gross activity in liquid sample streams up to 10 Ci/cc.

All of these components are located in the Radiochemistry Count Room, the Primary Laboratory, the PASS Sampling Room, in the general area of the PASS Sampling Room in the northwest corner of the 95' elevation of the Aux. Building, or the CAV-2 valve alley located in the Intermediate Building.

3.2 DEFINITIONS

3.2.1 RANGE - Radioiodine And Noble Gas Effluents

3.2.2 PASS - Post Accident Sample System

3.2.3 AIMS - Automated Isotopic Measurement System

3.3 RESPONSIBILITIES

The Nuclear Chemistry Manager is responsible for the content of this procedure, shall act as Interpretation Contact for any questions regarding intent, and has final authority regarding the procedure.

3.4 LIMITS & PRECAUTIONS

3.4.1 Performance of all or part of this procedure will be done on the instruction and authority of the Emergency Coordinator.

3.4.2 Entry into controlled access areas will be under the direction of the Radiation Monitoring Team as outlined in EM-209, Re-Entry Procedure.

3.4.3 For the on-line analysis essentially all operations may be conducted from the Counting Room, the Primary Laboratory and the Main Control Room, however, monitoring for radiological concerns should be provided.

3.4.4 An additional requirement of NUREG-0737 is the capability to remove grab samples of the reactor coolant should the in-line system fail or confirmations are requested.

3.4.5 During some post accident sampling, extremely high radiation dose levels could be experienced. The ability to perform all of this procedure will require pre-planning to stay within exposure limits and maintain doses as low as reasonably achievable.

3.4.6 As long as this procedure is being used, all samples are returned to the containment sump.

3.4.7 The VAX work station computer is the recommended system for performing Post Accident Sampling and Analysis. It is the only system capable of providing Live Spectral Acquisition; all other systems will only display "snap shots" of Spectral Acquisition.

3.5 PREREQUISITES

None

4.0 INSTRUCTIONS

- Ensure all breakers for required containment isolation valves are energized prior to leaving Sample Team Staging Area. Enclosure 7 lists these breakers, the valves they provide power to, and their locations.
- Complete Enclosure 4 and forwarded to the Emergency Coordinator prior to leaving the Sample Team Staging Area.
- Utilize Enclosure 1 to determine alternate sample points if flush times are going to be a limiting factor due to staytime.
- See Enclosure 5 for recommended sample flush times.

4.1 SAMPLING THE RCS WHILE STILL AT PRESSURE FOR BORON AND/OR GAMMA ISOTOPIC ANALYSES

NOTE: Dissolved hydrogen, pH and ion chromatographic analyses can be performed simultaneously with RCS gamma isotopic and boron analyses per section 4.2.

4.1.1 Place the following valves in the indicated position:

NOTE: These valves are operated from the PASS Analyzer Panel in the count room.

	VALVE	POSITION
4.1.1.1	CAV-484	Closed
4.1.1.2	CAV-519	Open
4.1.1.3	CAV-437	Open
4.1.1.4	CAV-439	Closed
4.1.1.5	CAV-448	Open
4.1.1.6	CAV-447	Open
4.1.1.7	CAV-623	Sample
4.1.1.8	CAV-624	Open
4.1.1.9	CAV-625	Sample

4.1.2 Place the following valves in the indicated position:

NOTE: These valves and pump controls are operated from the PASS Analyzer Panel in the count room.

	VALVE	POSITION
4.1.2.1	CAV-626	Drain Tank
4.1.2.2	CAV-636	Closed
4.1.2.3	CAP-10	Auto
4.1.2.4	CAP-10 (Flow Control Switch)	FULL CLOCKWISE
4.1.2.5	CAP-14	On

NOTE: The following breakers are normally in the locked open (Off) position by Operations due to not having automatic ES closure functions.

4.1.3 Energize, or verify energized, the following breakers:

- o DPDP5A (124' Control Complex, 480V Switchgear Rm.) Brk. No. 27 for CAV-434.
- o DPDP5B (124' Control Complex, 480V Switchgear Rm.) Brk. No. 8 for CAV-436.

NOTE: The following containment isolation valves are operated from the Main Control Board. Operations personnel will open when requested.

NOTE: See Enclosure 1 for alternate valve list.

4.1.4 Request operations to OPEN the following valves:

4.1.4.1 Open CAV-436 (Return to RB Sump, Outside Containment Valve).

4.1.4.2 Open CAV-434 (Return to RB Sump, Inside Containment Valve).

4.1.4.3 Open CAV-431 (Sample Supply to PASS Outside Containment).

4.1.4.4 Open CAV-126 (RCS Letdown Sample Supply to Liquid PASS, Inside Containment).

NOTE: As the control knob for CAV-484 is turned towards the open position, it will slowly move the actuator towards the open position. When turned towards the closed position, it will slowly move the actuator towards the closed position. Adjusting the valve control knob towards the open or closed position will vary the flow and pressure accordingly. Additional flow adjustments may be required when flow to other instrumentation is initiated or secured.

4.1.5 From CACP-1 in the Count Room, SLOWLY turn (open) the output adjustment control for CAV-484 until the pressure indicated on CA-89-PI is between 10-50 psig and the flow indicated on CA-74-FI is between 0.35-0.50 gpm.

4.1.6 IF a HI-HI level alarm occurs on CAT-8 (Drain tank) closing CAV-623 and stopping CAP-10,
THEN perform 4.1.6.1 through 4.1.6.7
AND continue with 4.1.7.

4.1.6.1 Place CAP-10 switch to "OFF" position.

4.1.6.2 Place CAV-623 to the "CLOSED" position.

4.1.6.3 Press and hold "RESET" button on Drain Tank level indicator (keep "HELD IN").

4.1.6.4 Turn CAP-10 switch to the "ON" position.

4.1.6.5 Hold "RESET" button "IN" until CAP-10 lowers Drain Tank level below "HI" level indicator/switch and "HI" level alarm light clears.

4.1.6.6 Place CAV-623 to the "OPEN" position.

4.1.6.7 Place CAP-10 switch to the "AUTO" position.

4.1.7 After sufficient sample flush per Enclosure 5, observe the indications of thermocouples CA-54-TE-1 (downstream of precooler CAHE-8) and CA-51-TE (downstream of cooler CAHE-5) by performing Steps 4.1.7.1 through 4.1.7.6.

4.1.7.1 Sign on the VAX computer as Username: PASS.

4.1.7.2 **Select** PASS Menu.

4.1.7.3 **Select** Display ND68DC Input Values.

4.1.7.4 ND68DC Input Values will be displayed. Note input number 11 for CA-54-TE-1 and input number 28 for CA-54-TE.

4.1.7.5 Temperatures of greater than 120 degrees F on CA-54-TE-1 and 100 degrees F on CA-51-TE indicate insufficient cooling.

4.1.7.6 IF these conditions exist,
THEN consult Chemistry Supervision for instructions.

4.1.7.7 Enter "**Q**" to exit.

4.1.7.8 Enter "**NO**" for printout.

4.1.8 Go to section 4.6 to perform a Gamma Isotopic Analysis after appropriate sample flush time is met.

4.1.9 Allow sample to flush through the Boronometer for at least one hour.

4.1.10 The Boron concentration of the sample will be displayed at the readout (CA-56-CI) located on the PASS Analyzer Panel in the countroom.

4.1.11 Leave system in present lineup to allow continuous Boron monitoring of the selected sample point.

NOTE: The following Steps (4.1.12 through 4.1.12.3) will isolate flow only to the boronometer. Flow to any of the other components lined up in Section 4.2 will be maintained.

4.1.12 IF required to isolate flow through the boronometer, THEN:

4.1.12.1 Close CAV-484.

4.1.12.2 Close CAV-623.

4.1.12.3 Close CAV-626.

4.1.13 IF a demin water flush of system is required, leave system lineup as is, THEN go to Section 4.9.

4.2 SAMPLING THE RCS WHILE STILL AT PRESSURE FOR DISSOLVED HYDROGEN, pH, AND/OR CHLORIDE ANALYSES

NOTE: Dissolved hydrogen, pH and ion chromatographic analyses can be performed simultaneously with RCS gamma isotopic and boron analyses.

4.2.1 IF flow is lined up to the boronometer, OR a gamma isotopic is being performed, THEN CAV-484 will be **OPEN**. Leave CAV-484 open in this situation.

4.2.2 IF the boronometer is not lined up, OR an isotopic is not being performed, THEN verify that CAV-484 is closed.

4.2.3 Place the following valves in the indicated position:

NOTE: These valves are operated from the PASS Analyzer Panel in the count room.

	VALVE	POSITION
4.2.3.1	CAV-437	Open
4.2.3.2	CAV-439	Closed
4.2.3.3	CAV-448	Open
4.2.3.4	CAV-627	Sample
4.2.3.5	CAV-628	Sample

	VALVE	POSITION
4.2.3.6	CAV-629	Sample
4.2.3.7	CAV-630	Sample
4.2.3.8	CAV-633	pH/IC
4.2.3.9	CAV-634	Sample
4.2.3.10	CAV-636	Closed
4.2.3.11	CAP-10	Auto
4.2.3.12	CAP-10 (Flow Control Switch)	FULL CLOCKWISE
4.2.3.13	CAP-14	On

NOTE: The following breakers are normally in the locked open (Off) position by Operations due to not having automatic ES closure functions.

4.2.4 Energize, or verify energized, the following breakers:

- o DPDP5A (124' Control Complex, 480V Switchgear Rm.) Brk. No. 27 for CAV-434.
- o DPDP5B (124' Control Complex, 480V Switchgear Rm.) Brk. No. 8 for CAV-436.

NOTE: The following containment isolation valves are operated from the Main Control Board. Operations personnel will open when requested.

NOTE: See Enclosure 1 for alternate valve list.

4.2.5 Request operations **OPEN** the following valves:

4.2.5.1 Open CAV-436 (Return to RB Sump, Outside Containment Valve).

4.2.5.2 Open CAV-434 (Return to RB Sump, Inside Containment Valve).

4.2.5.3 Open CAV-431 (Sample Supply to PASS Outside Containment).

4.2.5.4 IF RCS letdown is in service,
THEN open CAV-126 (RCS Letdown Sample Supply to Liquid PASS, Inside Containment).

4.2.5.5 IF RCS letdown is not in service,
THEN determine the valid sample point,
AND request operations open appropriate valve from Enclosure 1.

NOTE: As the control knob for CAV-631 is turned towards the open position, it will slowly move the actuator towards the open position. When turned towards the closed position, it will slowly move the actuator towards the closed position. Adjusting the valve control knob towards the open or closed position will vary the flow and pressure accordingly. Additional flow adjustments may be required when flow to other instrumentation is initiated or secured.

4.2.6 From CACP-1 in the Count Room, **SLOWLY** turn (open) the output adjustment control for CAV-631 until the pressure indicated on CA-77-PI is between 10-50 psig and the flow indicated on CA-78-FI **AND** CA-80-FI is as close to 0.067 gpm as possible.

4.2.7 IF a HI-HI level alarm occurs on CAT-8 (Drain tank) closing CAV-627 and stopping CAP-10,
THEN perform 4.2.7.1 through 4.2.7.7
AND continue with 4.2.8.

4.2.7.1 Place CAP-10 switch to "OFF" position.

4.2.7.2 Place CAV-627 to the "CLOSED" position.

4.2.7.3 Press and hold "RESET" button on Drain Tank level indicator (keep "HELD IN").

4.2.7.4 Turn CAP-10 switch to the "ON" position.

4.2.7.5 Hold "RESET" button "IN" until CAP-10 lowers Drain Tank level below "HI" level indicator/switch and "HI" level alarm light clears.

4.2.7.6 Place CAV-627 to the "OPEN" position.

4.2.7.7 Place CAP-10 switch to the "AUTO" position.

4.2.8 After sufficient sample flush per Enclosure 5, observe the indications of thermocouples CA-54-TE-1 (downstream of precooler CAHE-8) and CA-51-TE (downstream of cooler CAHE-5).

4.2.8.1 Sign on the VAX computer as Username: PASS.

4.2.8.2 **Select** PASS Menu.

4.2.8.3 **Select** Display ND68DC Input Values.

4.2.8.4 ND68DC Input Values will be displayed. Note input number 11 for CA-54-TE-1 and input number 28 for CA-54-TE.

4.2.8.5 Temperatures of greater than 120 degrees F on CA-54-TE-1 and 100 degrees F on CA-51-TE indicate insufficient cooling.

4.2.8.6 IF these conditions exist,
THEN consult Chemistry Supervision for instructions.

4.2.8.7 Enter "Q" to exit.

4.2.8.8 Enter "NO" for printout.

4.2.9 IF a chloride analysis is required,
THEN go to section 4.7.

4.2.10 Allow the sample to purge through the dissolved hydrogen and pH sensors for at least 15 minutes to insure that a representative sample has been obtained.

4.2.11 The dissolved hydrogen concentration will be displayed on the electronics readout CA-55-CI located on the Pass Analyzer Panel in the countroom.

4.2.12 The sample pH will be displayed on the electronics readout CA-73-CI also located on the PASS Analyzer Panel in the countroom.

NOTE: The following step will isolate flow only to the Dissolved Hydrogen, pH and I.C. analyzers. Flow to any of the other components lined up in Section 4.1 will be maintained.

4.2.13 IF isolation is desired to the Dissolved Hydrogen, pH, or I.C. analyzers,
THEN:

4.2.13.1 Close CAV-627.

4.2.13.2 Close CAV-628.

4.2.13.3 Close CAV-629.

4.2.13.4 Close CAV-630.

4.2.13.5 Close CAV-633.

4.2.13.6 Close CAV-634.

4.2.14 IF a demin water flush of system is required, leave system lineup as is,
THEN go to Section 4.9.

4.3 SAMPLING THE RCS WHEN ON DECAY HEAT OR LOW PRESSURE INJECTION FOR BORON AND/OR GAMMA ISOTOPIC ANALYSES

NOTE: These analyses can be performed simultaneously if desired.

NOTE: These valves are operated from the PASS Analyzer Panel in the count room.

4.3.1 Place the following valves in the indicated position:

	VALVE	POSITION
4.3.1.1	CAV-519	Open
4.3.1.2	CAV-447	Open
4.3.1.3	CAV-437	Open
4.3.1.4	CAV-439	Closed
4.3.1.5	CAV-448	Open
4.3.1.6	CAV-623	Sample
4.3.1.7	CAV-625	Sample
4.3.1.8	CAV-626	Drain Tank
4.3.1.9	CAV-636	Closed
4.3.1.10	CAP-10	Auto
4.3.1.11	CAP-10 (Flow Control Switch)	FULL CLOCKWISE
4.3.1.12	CAP-14	On

NOTE: The following breakers are normally in the locked open (Off) position by Operations due to not having automatic ES closure functions.

4.3.2 Energize, or verify energized, the following breakers:

- o DPDP5A (124' Control Complex, 480V Switchgear Rm.) Brk. No. 27 for CAV-434.
- o DPDP5B (124' Control Complex, 480V Switchgear Rm.) Brk. No. 8 for CAV-436.

NOTE: The following containment isolation valves are operated from the Main Control Board. Operations personnel will open when requested.

NOTE: See Enclosure 1 for alternate valve list.

4.3.3 Request operations **OPEN** the following valves:

4.3.3.1 Open CAV-436 (Return to RB Sump, Outside Containment Valve).

4.3.3.2 Open CAV-434 (Return to RB Sump, Inside Containment Valve).

NOTE: The following valves are operated from the PASS Analyzer Panel in the Count Room.

4.3.4 IF the "A" DH train is to be sampled,
THEN open CAV-441 (Isolation for Decay Heat Train "A"), OR
IF the "B" DH train is to be sampled,
THEN open CAV-442 (Isolation for Decay Heat Train "B").

4.3.5 Open CAV-440 (Inlet to Low Pressure AIMS Sample Loop).

4.3.6 SLOWLY move the actuator switch on CAV-624 towards the open position, while carefully monitoring the downstream flowrate on CA-74-FI, UNTIL the flow rate indicated on CA-74-FI is 0.35 to 0.5 GPM.

4.3.7 IF a HI-HI level alarm occurs on CAT-8 (Drain tank) closing CAV-623 and stopping CAP-10,
THEN perform 4.3.7.1 through 4.3.7.7
AND continue with 4.3.8.

4.3.7.1 Place CAP-10 switch to "OFF" position.

4.3.7.2 Place CAV-623 to the "CLOSED" position.

4.3.7.3 Press and hold "RESET" button on Drain Tank level indicator (keep "HELD IN").

4.3.7.4 Turn CAP-10 switch to the "ON" position.

4.3.7.5 Hold "RESET" button "IN" until CAP-10 lowers Drain Tank level below "HI" level indicator/switch and "HI" level alarm light clears.

4.3.7.6 Place CAV-623 to the "OPEN" position.

4.3.7.7 Place CAP-10 switch to the "AUTO" position.

4.3.8 IF a Gamma Isotopic Analysis is required,
THEN go to section 4.6.

4.3.9 Allow the sample to purge through the boronometer for one hour.

4.3.10 The Boron concentration of the sample will be displayed at the readout (CA-56-CI) located on the PASS Analyzer Panel in the countroom.

4.3.11 IF required to isolate flow through the boronometer,
THEN:

4.3.11.1 Close CAV-623.

4.3.11.2 Close CAV-626.

4.3.12 IF a demin water flush of system is required, leave system lineup as is,
THEN go to Section 4.10.

4.4 SAMPLING THE REACTOR BUILDING SUMP FOR BORON AND/OR GAMMA ISOTOPIC ANALYSES

NOTE: These analyses can be performed simultaneously if desired.

NOTE: These valves are operated from the PASS Analyzer Panel located in the count room.

4.4.1 Place the following valves in the indicated position:

	VALVE	POSITION
4.4.1.1	CAV-519	Open
4.4.1.2	CAV-447	Open
4.4.1.3	CAV-437	Open
4.4.1.4	CAV-439	Closed
4.4.1.5	CAV-448	Open
4.4.1.6	CAV-623	Sample
4.4.1.7	CAV-625	Sample
4.4.1.8	CAV-626	Drain Tank
4.4.1.9	CAV-636	Closed

	VALVE	POSITION
4.4.1.10	CAP-10	Auto
4.4.1.11	CAP-10 (Flow Control Switch)	FULL CLOCKWISE
4.4.1.12	CAP-14	On

NOTE: The following breakers are normally in the locked open (Off) position by Operations due to not having automatic ES closure functions.

4.4.2 Energize, or verify energized, the following breakers:

- o DPDP5A (124' Control Complex, 480V Switchgear Rm.) Brk. No. 27 for CAV-433, and CAV-434.
- o DPDP5B (124' Control Complex, 480V Switchgear Rm.) Brk. No. 8 for CAV-435, and CAV-436.

NOTE: The following containment isolation valves are operated from the Main Control Board. Operations personnel will open when requested.

NOTE: See Enclosure 1 for alternate valve list.

4.4.3 Request operations **OPEN** the following valves:

4.4.3.1 Open CAV-436 (Return to RB Sump, Outside Containment Valve).

4.4.3.2 Open CAV-434 (Return to RB Sump, Inside Containment Valve).

NOTE: Steps 4.4.4 and 4.4.6 are to utilize demineralized water to initially cool the RB Sump Sample until flow is established. These steps will prevent possible flashing in the CAP-8 suction line.

4.4.4 Open DWV-337 (Demin Water Supply Valve).

4.4.5 Open CAV-521.

4.4.6 Open CAV-471 to prime CAP-8.

4.4.7 Start CAP-8 (RB Sump recirculation pump).

4.4.8 SLOWLY move the actuator switch on CAV-624 towards the open position, while carefully monitoring the downstream flowrate on CA-74-FI,
UNTIL the flow rate indicated on CA-74-FI is 0.35 to 0.5 GPM.

NOTE: The following containment isolation valves are operated from the Main Control Board. Operations personnel will open when requested.

NOTE: See Enclosure 1 for alternate valve list.

4.4.9 Request operations OPEN the following valves:

4.4.9.1 CAV-433 (RB Sump Suction, Inside Containment).

4.4.9.2 CAV-435 (RB Sump Suction, Outside Containment).

4.4.10 When sample flow has stabilized on CA-74-FI (approximately 5 minutes), close CAV-471.

NOTE: The following valves are operated from the PASS Analyzer Panel located in the Count Room.

4.4.11 SLOWLY move the actuator switch on CAV-624 towards the open position, while carefully monitoring the downstream flowrate on CA-74-FI,
UNTIL the flow rate indicated on CA-74-FI is 0.35 to 0.5 GPM.

4.4.12 IF a HI-HI level alarm occurs on CAT-8 (Drain tank) closing CAV-623 and stopping CAP-10,
THEN perform 4.4.12.1 through 4.4.12.7
AND continue with 4.4.13.

4.4.12.1 Place CAP-10 switch to "OFF" position.

4.4.12.2 Place CAV-623 to the "CLOSED" position.

4.4.12.3 Press and hold "RESET" button on Drain Tank level indicator (keep "HELD IN").

4.4.12.4 Turn CAP-10 switch to the "ON" position.

4.4.12.5 Hold "RESET" button "IN" until CAP-10 lowers Drain Tank level below "HI" level indicator/switch and "HI" level alarm light clears.

4.4.12.6 Place CAV-623 to the "OPEN" position.

4.4.12.7 Place CAP-10 switch to the "AUTO" position.

4.4.13 IF a Gamma Isotopic Analysis is required,
THEN go to section 4.6.

4.4.14 Allow the sample to purge through the boronometer for one hour.

4.4.15 The Boron concentration of the sample will be displayed at the readout (CA-56-CI) located on the PASS Analyzer Panel in the countroom.

4.4.16 IF required to isolate flow through the boronometer,
THEN:

4.4.16.1 Close CAV-623.

4.4.16.2 Close CAV-626.

4.4.17 IF a demin water flush of system is required, leave system lineup as is,
THEN go to section 4.12.

4.5 SAMPLING THE MISC. WASTE STORAGE TANK FOR BORON AND/OR GAMMA ISOTOPIC ANALYSIS

NOTE: These analyses can be performed simultaneously, if desired.

4.5.1 Request Operations verify that WDP-6A and/or WDP-6B (MWST Recirculation Pumps) are running.

4.5.2 Place the following valves in the indicated position:

NOTE: These valves are operated from the PASS Analyzer Panel located in the count room.

	VALVE	POSITION
4.5.2.1	CAV-519	Open
4.5.2.2	CAV-447	Open
4.5.2.3	CAV-437	Open
4.5.2.4	CAV-439	Closed
4.5.2.5	CAV-448	Open

	VALVE	POSITION
4.5.2.6	CAV-623	Sample
4.5.2.7	CAV-625	Sample
4.5.2.8	CAV-626	Drain Tank
4.5.2.9	CAV-636	Closed
4.5.2.10	CAP-10	Auto
4.5.2.11	CAP-10 (Flow Control Switch)	FULL CLOCKWISE
4.5.2.12	CAP-14	On

NOTE: The following breakers are normally in the locked open (Off) position by Operations due to not having automatic ES closure functions.

4.5.3 Energize, or verify energized, the following breakers:

- o DPDP5A (124' Control Complex, 480V Switchgear Rm.) Brk. No. 27 for CAV-434.
- o DPDP5B (124' Control Complex, 480V Switchgear Rm.) Brk. No. 8 for CAV-436.

NOTE: The following containment isolation valves are operated from the Main Control Board. Operations personnel will open when requested.

NOTE: See Enclosure 1 for alternate valve list.

4.5.4 Request operations **OPEN** the following valves:

4.5.4.1 Open CAV-436 (Return to RB Sump, Outside Containment Valve).

4.5.4.2 Open CAV-434 (Return to RB Sump, Inside Containment Valve).

4.5.5 Open CAV-444.

4.5.6 Open CAV-443.

4.5.7 SLOWLY move the actuator switch on CAV-624 towards the open position, carefully monitoring the downstream flowrate on CA-74-FI, UNTIL the flow rate indicated on CA-74-FI is 0.35 to 0.5 GPM.

4.5.8 IF a HI-HI level alarm occurs on CAT-8 (Drain tank) closing CAV-623 and stopping CAP-10,
THEN perform 4.5.8.1 through 4.5.8.7
AND continue with 4.5.9.

4.5.8.1 Place CAP-10 switch to "OFF" position.

4.5.8.2 Place CAV-623 to the "CLOSED" position.

4.5.8.3 Press and hold "RESET" button on Drain Tank level indicator (keep "HELD IN").

4.5.8.4 Turn CAP-10 switch to the "ON" position.

4.5.8.5 Hold "RESET" button "IN" until CAP-10 lowers Drain Tank level below "HI" level indicator/switch and "HI" level alarm light clears.

4.5.8.6 Place CAV-623 to the "OPEN" position.

4.5.8.7 Place CAP-10 switch to the "AUTO" position.

4.5.9 IF a Gamma Isotopic Analysis is required,
THEN go to Section 4.6.

4.5.10 Allow the sample to purge through the boronometer for one hour.

4.5.11 The Boron concentration of the sample will be displayed at the readout (CA-56-CI) located on the PASS Analyzer Panel in the countroom.

4.5.12 IF required to isolate flow through the boronometer,
THEN:

4.5.12.1 Close CAV-623.

4.5.12.2 Close CAV-626.

4.5.13 IF a demin water flush of system is required, leave system lineup as is,
THEN go to section 4.11.

4.6 GAMMA ISOTOPIC ANALYSIS

4.6.1 Prior to continuing with this section, insure the following concerns are met:

****
CAUTION: Never reset the Liquid Nitrogen Monitor until the High Voltage bias has been lowered to 0 volts.
****

- o Detector should have an adequate supply of Liquid Nitrogen.
- o High Voltage should be applied to the Liquid PASS detector and not disabled by the Liquid Nitrogen Monitor.
- o A weekly detector calibration should have been performed within the past 7 days.

NOTE: Assure minimum flush times are met as per ENCLOSURE 5.

4.6.2 Sign on the VAX computer as Username: PASS.

NOTE: The <SELECT> option is designated by the PF1 key.

4.6.3 **<SELECT>** PASS Menu.

4.6.4 Answer **"NO"** to "Do you want a spectral display window?".(Default)

4.6.5 **<SELECT>** Liquid Sampling.

4.6.6 **<SELECT>** appropriate sample point. Collimator will move to correct position.

4.6.7 The MUX values will be displayed. Enter **"Q"** to continue, or **<RETURN>** to get an update to the values.

4.6.8 **Enter "NO"** to abort sample. (Default value).

4.6.9 Update sample parameters and Press **<ACCEPT>**.

4.6.10 The system will now perform a count rate check to establish the best counting geometry.

4.6.11 Once acquisition is complete, all reports will be output to a printing device.

4.6.12 IF a demin flush is required,
THEN go to the appropriate section depending on sample flow lineup:

Section	Sample Flow Lineup
4.9	RCS at pressure
4.10	Decay Heat
4.11	MWST
4.12	RB Sump

4.7 CHLORIDE ANALYSIS

4.7.1 Before starting up the Dionex IC check the following:

- o IC plugged into the 120 VAC labeled "PASS chromatograph only".
- o Red instrument air tubing secured to air bulkhead.
- o Blue eluent tubing secured to analytical pump outlet.
- o White eluent delivery tubing secured to the analytical pump inlet bulkhead (#1 position) for sodium tetraborate.
- o White demin water delivery tubing secured to the analytical pump inlet bulkhead (#6 position).
- o Adequate volumes of eluent, regenerants, demin water, and calibration solution are in their containers. For reagent preparation, see Enclosure 2.
- o Adjust air pressure to regenerate container to insure proper delivery.
- o Thermal conductivity BNC leads are properly connected to the back of the conductivity detector module (Two cell leads and one Thermistor Lead).
- o Insure that the integrator to be used is connected to the "Chart Recorder" output of the conductivity detector module.

4.7.2 Depress the POWER button. Instrument LEDs will light.

4.7.3 Verify the following conductivity detector module LEDs are in their correct positions:

- o Local/Remote is "Local".
- o CELL is "ON".
- o Auto OFFSET is "OFF".
- o Temperature Compensator is "1.7".
- o Scale - the scale setting can be varied depending on the nature of the sample being analyzed. The scale automatically sets itself at 30 when the POWER button is depressed. If, after obtaining the first printout, there is a peak(s) that is off-scale, increase the scale setting 1 increment and repeat the analysis. The goal is to have the scale setting as low as possible while maintaining all peaks of interest on scale.

4.7.4 Verify the following analytical pump module setpoints:

- o Local/Remote is "Local".
- o Low Pressure Pump trip is 20#.
- o High Pressure Pump trip to be set at 200 psi above operating pressure.
- o Flow rate is 2.0 ml/min.

NOTE: Eluent #1 is for determination of chloride in a boron matrix - this eluent will not elute sulfates.

4.7.5 Select the eluent solution to be used and depress its corresponding selector switch. A red LED lamp should light just to the right of the switch.

4.7.6 Depress the analytical pump Stop/Start Switch. As the pump comes on the LED should move from the stop to the start position and the pressure indication (located just below the Stop/Start Switch) should start to increase. It is not uncommon to have to start the pump 2 or 3 times before it will stay on. The pump outlet pressure indication will stabilize momentarily and the pump "Ready" LED will light.

NOTE: If the system pressure is indicated to be less than 20#, the low pressure trip point set in 4.7.4 will have to be lowered to 0 until after the pump is started and system pressure has risen to at least 30#.

NOTE: If the pump will not sustain a stable pressure, one or both of the pump cylinders is airlocked. Enclosure 6 explains the procedure for priming the airlocked pump.

4.7.7 At the top of the Advanced Chromatography Module are two sets of valve controls labeled System 1 and System 2. System 2 is reserved for PASS use. Verify the following System 2 valve positions:

- o Load/Inject is Load".
- o "A" valve is "OFF".
- o "B" valve is "ON".
- o Local/Remote is "Local".

4.7.8 Allow the conductivity reading to stabilize before continuing. It is considered stable when the reading is unchanged (to two decimal places) for 2 minutes.

NOTE: Insure that calibration solution does not run dry.

NOTE: The line from the IC calibration pump to the 'B' valve can be flushed at greater than 15% pump stroke if the 'B' valve is switched "OFF" before the pump stroke is raised. Switching the 'B' valve "OFF" diverts the flow to waste allowing rapid line flushing. Return the pump stroke to between 10% and 15% before returning the 'B' valve to the "ON" position.

NOTE: If the calibration pump is not operational, calibration solution may be loaded manually using a syringe with a block coupler in the PASS cabinet in the PASS Room, disconnect the sample inlet line from the load/inject valve and connect the syringe. Slowly inject ~ 1 ml of calibration solution.

4.7.9 Align the Calibration Solution Select Valve to the "calibration" position and start the calibration pump (at the reagents cabinet outside the wall of the PASS room).

4.7.10 IF the Chromjet SP4400 Integrator is to be used,
THEN GO TO Section 4.7.11 to setup integrator
AND continue with Section 4.7.13.

4.7.10.1 IF the 4270 Integrator is to be used,
THEN GO TO Section 4.7.12 to setup integrator
AND continue with Section 4.7.13.

4.7.11 SP4400 INTEGRATOR SETUP

4.7.11.1 IF a "PASS Calibration" file is known to be present in the SP4400 integrator's memory,
THEN enter "FI=n"(where "n" is the number corresponding to the current PASS file from the most recent calibration data in the Instrument log book).

4.7.11.2 Review FILE printout.

4.7.11.3 To edit a function or sample parameter in the file, enter an equality statement between the function or parameter and the value you wish to enter.

EXAMPLE 1: To set the first components' retention time to 1.91:

- Enter **<RT(1)=1.91>**
- Press **<ENTER>**

EXAMPLE 2: To set the method peak threshold to 6000:

- Enter **<PT=6000>**
- Press **<ENTER>**

4.7.11.4 IF a "PASS Calibration" file does not exist,
THEN see Enclosure 9 for an example file to enter.

4.7.11.5 A file may be initially entered using the integrator "DIALOG" function.

4.7.12 4270 INTEGRATOR SETUP

4.7.12.1 IF a "PASS Calibration" file is known to be present in the 4270 Integrator's memory,
THEN: press "USE FILE" button.

4.7.12.2 Enter the number for the FILE.

4.7.12.3 Press "ENTER" button.

4.7.12.4 Press "PRFILE" button.

4.7.12.5 Review FILE printout.

4.7.12.6 IF a "PASS Calibration" file does not exist,
THEN see Enclosure 10 for an example file to enter.

4.7.13 As soon as the conductivity reading has stabilized the IC is ready to perform a calibration check. Utilize the AUTO OFFSET switch on the Conductivity Detector module to better determine the rate of change in the conductivity reading. Proceed when the reading has completely stabilized.

4.7.14 Switch the Auto Offset "OFF" and "ON". Wait 10 seconds.

4.7.15 Simultaneously switch the System 2 Load/Inject valve to the "Inject" position AND depress the "INJA" button on the integrator.

4.7.16 After 10 seconds return the Load/Inject valve to the "Load" position.

4.7.17 When the chromatographic separation is complete, "Stop" the integrator. Adjust the scale position as needed to place all peaks of interest on scale.

4.7.18 After allowing the conductivity reading to restabilize, repeat 4.7.14 thru 4.7.17 until you get 2 consecutive printouts in which the ion peaks of interest are of equal height or area (± 10%).

4.7.19 IF using the SP4400 integrator,
THEN GO TO Section 4.7.20 to edit the calibration table
AND continue with Section 4.7.22.

IF using the 4270 integrator,
THEN GO TO Section 4.7.21 to edit the calibration table
AND continue with Section 4.7.22.

4.7.20 Editing a calibration table in the SP4400 integrator

4.7.20.1 Take the "AREA" of the ion peak of interest from the last printout and divide the "AREA" by the concentration of the calibration standard. This is the "RF" value.

4.7.20.2 Edit the "RF" value by pressing the following buttons:

[R] [F] [(] [1] [)] [=]

4.7.20.3 Enter the numerical value for "RF" and press the "ENTER" button.

Example. To change the "RF" value to 11501 press:

[R] [F] [(] [1] [)] [=] [1] [1] [5] [0] [1] [ENTER]

4.7.20.4 Edit the retention time by pressing the following buttons:

[R] [T] [(] [1] [)] [=]

4.7.20.5 Enter the numerical value for the retention time and press the "ENTER" button.

Example. To change to a retention time of 4.86 minutes press:

[R] [T] [(] [1] [)] [=] [4] [.] [8] [6] [ENTER]

4.7.20.6 Continue with Step 4.7.22.

4.7.21 Editing a calibration table in the 4270

4.7.21.1 Take the "AREA" of the ion peak of interest from the last printout and divide the "AREA" by the concentration of the calibration standard. This is the "RF" value.

4.7.21.2 Edit the "RF" value by pressing the following buttons:

[SHIFT] [SHIFT] [R] [F] [SHIFT] [(] [1] [)] [=]

4.7.21.3 Enter the numerical value for "RF" and press the "ENTER" button.

Example. To change the "RF" value to 11501 press:

[SHIFT] [SHIFT] [R] [F] [SHIFT] [(] [1] [)] [=] [1] [1] [5] [0] [1] [ENTER]

4.7.21.4 Edit the retention time by pressing the following buttons:

[SHIFT] [SHIFT] [R] [T] [SHIFT] [(] [1] [)] [=]

4.7.21.5 Enter the numerical value for the retention time and press the "ENTER" button.

Example. To change to a retention time of 4.86 minutes press:

[SHIFT] [SHIFT] [R] [T] [SHIFT] [(] [1] [)] [=] [4] [.] [8] [6] [ENTER]

4.7.21.6 Continue with step 4.7.22.

4.7.22 Open CAV-525.

4.7.23 Prior to beginning the sample analysis:

- o Switch the 'B' valve "OFF".
- o Turn "OFF" the calibration solution pump.
- o Insure the conductivity reading is stabilized and zeroed by cycling the Auto offset "OFF" and "ON".
- o Insure the Load/Inject switch is in "Load" for at least 1 minute.

4.7.24 BEGIN sample analysis by simultaneously depressing the integrator "INJA" button AND switching the Load/Inject valve to "Inject". This initiates chromatographic separation of the sample.

4.7.25 Allow the separation at least 10 minutes before stopping the integrator. The integrator printout will compute the chloride and sulfate concentrations directly.

4.7.26 Repeat 4.7.23 and 4.7.25 until 2 consecutive analyses show equal (± 10%) amounts of anions of interest in the sample.

NOTE: It may take 2 or 3 sample analysis to completely flush the calibration standards from the system.

4.7.27 Upon finishing the sample analysis the column must be rinsed with demin water to prevent carbonate fouling.

4.7.27.1 Depress Eluent Switch #6 until its LED indicator lights.

4.7.27.2 Depress Eluent Switch #1, or 3, until its LED indicator goes out. These 2 steps switch the pump suction from eluent to demin water.

4.7.28 WHEN the conductivity reading stabilizes,
THEN perform the following to secure the IC:

4.7.28.1 "A" valve "OFF".

4.7.28.2 "B" valve "OFF".

4.7.28.3 Pump Stop/Start to "Stop".

4.7.28.4 Power "OFF".

4.7.28.5 Secure air pressure to regenerant container.

4.8 GRAB SAMPLING

NOTE: Preplanning is required to address radiological concerns and Health Physics coverage should be supplied prior to continuing with this procedure as outlined in EM-209, Re-Entry Procedure.

4.8.1 IF the required lineup is not established for the sample point of interest,
THEN GO TO Sections 4.1, 4.3, 4.4, or 4.5 to lineup sample and continue to Section 4.8.3.

4.8.2 IF the required lineup is established for the sample point of interest,
THEN GO TO Step 4.8.3.

4.8.3 Prior to Grab Sampling:

- o Insure engagement of cart by unlocking the cart from the station and moving the engagement handle back and forth. If properly engaged, the cart will also move back and forth. Re-lock the cart to the station.
- o Check the 3-way valves in the open (counter-clockwise) position (Grab Sampler Inlet and Outlet Valves).
- o Turn on the Grab Sampler exhaust fan. The switch is located to the rignt of the Intermediate Building door (across from RM-A7).
- o Install the Grab Sampler ramp.
- o Insure the transit cover and a wrench are available. The properly sized wrench is available in the Primary Chemistry Lab hanging on the key locker.

4.8.4 From the PASS Mimic Panel in the Counting Room perform the following lineup to put flow through the grab sampler:

4.8.4.1 Open CAV-445.

4.8.4.2 Open CAV-446.

4.8.4.3 Close CAV-447.

4.8.5 Allow 5 to 15 minutes for sample to purge through the sampler.

4.8.6 Using the T-handle, turn the Grab Sampler three-way valves fully clockwise to isolate the sample in the sample bomb.

4.8.7 From the PASS Mimic Panel in the Counting Room:

4.8.7.1 Close CAV-445.

4.8.7.2 Close CAV-446.

4.8.7.3 Open CAV-447.

4.8.8 Perform demin water flush per Sections 4.9, 4.10, 4.11, or 4.12 depending on sample flow lineup.

****

CAUTION: Perform a demin water flush Before removing the grab sampler.

****

4.8.9 Removing the Grab Sampler

4.8.9.1 Disconnect the Grab Sampler from the sample station by squeezing the disengagement lever and by pushing the engagement handle to its rearmost position.

4.8.9.2 Pull up on the handle of the cart locking mechanism to release the cart.

4.8.9.3 Remove the Grab Sampler and cart to the Turbine Building crane well and install the transit cover over the quick-connects. The grab sampler can be removed from the cart using a wrench and transported off-site.

4.8.10 Installing a new Grab Sampler

4.8.10.1 Bolt the Grab Sampler onto the cart and remove the transit cover. Attach the transit cover to the lifting ring.

4.8.10.2 Using the T-handle, position the Grab Sampler 3-way valves to the fully counter-clockwise position for sampling.

4.8.10.3 With one person guiding the sampler assembly, another person should push it up the ramp and onto the platform, halting several inches from the connection points.

****

CAUTION: When connecting the sampler, force should NEVER be used. Damage to the quick-connects will result from forcing the connection.

****

4.8.10.4 Very carefully, slowly push the sampler into the sample station. If positioned correctly, the front of the sampler will make metal-to-metal contact with the curved face of the sample station.

4.8.10.5 IF the sampler does not position correctly,
THEN pull the cart back a short distance and realign it.

4.8.10.6 Repeat Step 4.8.10.4 to position sampler. Repeated attempts may be necessary for proper alignment.

4.8.10.7 Lock the cart to the station by pushing the handle of the locking mechanism completely down, driving the lock-bolt through the hole in the cart.

4.8.10.8 Gently pull the engagement handle forward until a distinct "click" is heard (the handle must NOT be forced). This signifies that the quick-connects have engaged.

NOTE: Due to environmental conditions, the click may not be heard.

4.8.10.9 To insure engagement, unlock the cart from the station and move the engagement handle back and forth.

4.8.10.10 IF properly engaged,
THEN the cart will also move back and forth.

4.8.10.11 Re-lock the cart to the station.
The Grab Sampler is now ready for use.

4.8.11 Continue with Step 4.9.23 to secure valve lineup.

4.9 DEMINERALIZED WATER FLUSH AND SYSTEM SHUTDOWN AFTER SAMPLING RCS LETDOWN AT PRESSURE FOR GAMMA ISOTOPIC, BORON, DISSOLVED HYDROGEN, pH, ION CHROMATOGRAPHIC ANALYSES, OR ACQUIRING A GRAB SAMPLE

NOTE: When securing sample lineup to flush any component and associated sample lines with demin water, sample flow will also be secured to any other analyzers that are on line. Depending on system lineup, the following valves may already be positioned correctly for a demin water flush.

NOTE: These valves are operated from the main control board located in the control room.

4.9.1 Request operations:

4.9.1.1 Close CAV-126

4.9.1.2 Close CAV-431

4.9.2 Place the following valves in the indicated position:

NOTE: These valves are operated from the Pass Analyzer Panel in the count room.

	VALVE	POSITION
4.9.2.1	CAV-484	Closed
4.9.2.2	CAV-623	Closed
4.9.2.3	CAV-624	Open
4.9.2.4	CAV-626	Drain Tank
4.9.2.5	CAV-631	Closed
4.9.2.6	CAV-627	Closed
4.9.2.7	CAV-633	pH/IC
4.9.2.8	CAV-634	Sample
4.9.2.9	CAV-636	Closed
4.9.2.10	CAP-10	Auto
4.9.2.11	CAP-10 (Flow Control Switch)	FULL CLOCKWISE
4.9.2.12	CAP-14	On

NOTE: These valves are operated from the Pass Analyzer Panel in the count room.

4.9.3 Open DWV-337.

4.9.4 Open CAV-470.

4.9.5 Place CAV-623 in the "SAMPLE" position.

4.9.6 Place CAV-627 in the "SAMPLE" position.

4.9.7 Adjusting demin water flowrate through the boronometer

NOTE: As the control knob for CAV-484 is turned towards the open position, it will slowly move the actuator towards the open position. When turned towards the closed position, it will slowly move the actuator towards the closed position. Adjusting the valve control knob towards the open or closed position will vary the flow and pressure accordingly. Additional flow adjustments may be required when flow to other instrumentation is initiated or secured.

4.9.7.1 From CACP-1 in the Count Room, turn (open) the output adjustment control for CAV-484 until the pressure indicated on CA-89-PI is between 10-50 psig and the flow indicated on CA-74-FI is between 0.35 to 0.50 gpm.

4.9.7.2 Continue with Step 4.9.9

4.9.8 Adjusting demin water flowrate to the Dissolved Hydrogen sensors

NOTE: These valves are operated from the Pass Analyzer Panel in the count room.

4.9.8.1 Check closed:

- o CAV-627.
- o CAV-633.

4.9.8.2 Place CAV-631 in the "CLOSED" position.

4.9.8.3 Place CAV-627 in the "SAMPLE" position.

4.9.8.4 Place CAV-628 in the "SAMPLE" position.

4.9.8.5 Place CAV-628 in the "SAMPLE" position.

4.9.8.6 Place CAV-629 in the "SAMPLE" position.

4.9.8.7 Place CAV-630 in the "SAMPLE" position.

4.9.8.8 Place CAV-634 in the "SAMPLE" position.

4.9.8.9 Place CAV-633 in the "pH/IC" position.

NOTE: As the control knob for CAV-631 is turned towards the open position, it will slowly move the actuator towards the open position. When turned towards the closed position, it will slowly move the actuator towards the closed position. Adjusting the valve control knob towards the open or closed position will vary the flow and pressure accordingly. Additional flow adjustments may be required when flow to other instrumentation is initiated or secured.

4.9.8.10 From CACP-1 in the Count Room, turn (open) the output adjustment control for CAV-631 until the pressure indicated on CA-77-PI is between 10 to 50 psig and the flow indicated on CA-78-FI AND CA-80-FI is as close to 0.067 gpm as possible.

4.9.9 Allow the water to flush for 10 minutes.

4.9.10 IF a HI-HI level alarm occurs on CAT-8 (Drain tank) closing CAV-623, CAV-627, and stopping CAP-10,
THEN perform 4.9.10.1 through 4.9.10.9
AND continue with 4.9.11.

4.9.10.1 Place CAP-10 switch to "OFF" position.

4.9.10.2 Place CAV-623 to the "CLOSED" position.

4.9.10.3 Place CAV-627 to the "CLOSED" position.

4.9.10.4 Press and hold "RESET" button on Drain Tank level indicator (keep "HELD IN").

4.9.10.5 Turn CAP-10 switch to the "ON" position.

4.9.10.6 Hold "RESET" button "IN" until CAP-10 lowers Drain Tank level below "HI" level indicator/switch and "HI" level alarm light clears.

4.9.10.7 Place CAV-623 to the "OPEN" position.

4.9.10.8 Place CAV-627 to the "OPEN" position.

4.9.10.9 Place CAP-10 switch to the "AUTO" position.

NOTE: A low liquid nitrogen level will automatically secure the high voltage supply to the detector. Always lower the high voltage to zero volts before resetting the liquid nitrogen monitor.

4.9.11 Ensure the A.I.M.S. is in an operable condition by:

- o Checking the liquid nitrogen monitor
- o Ensuring the high voltage supply to the detector is properly adjusted

4.9.12 Sign on the VAX computer as Username: PASS.

NOTE: The <SELECT> option is designated by the PF1 key.

4.9.13 **<SELECT>** PASS Menu.

4.9.14 Answer **"NO"** to "Do you want a spectral display window?".(Default)

4.9.15 **<SELECT>** Flush Sample Lines.

4.9.16 **<SELECT>** RCS Demin Flush.

4.9.17 The collimator will move to the correct position and the system will begin to acquire a spectrum. Maximize MCA Display 1 and toggle thru ADC's until RCS configuration is shown.

NOTE: Step 4.9.18 cannot be performed from a remote terminal.

4.9.18 Use **"ERASE"** function on MCA Display to re-acquire spectrum.

4.9.19 IF a high countrate is still indicated,
THEN continue flushing.

4.9.20 IF a low stable countrate is indicated,
THEN:

4.9.20.1 Minimize MCA Display 1.

4.9.20.2 Press **<RETURN>**.

4.9.20.3 Press **<QUIT>**.

4.9.20.4 Sign off VAX computer by entering **"LO"**.

4.9.21 IF a grab sample was not performed,
THEN go to Step 4.9.23.

NOTE: These valves are operate from the PASS Analyzer Panel in the Counting Room:

4.9.22 IF a Grab Sample was performed,
THEN:

4.9.22.1 Close CAV-447.

4.9.22.2 Open CAV-445.

4.9.22.3 Open CAV-446.

4.9.22.4 Continue flush for 5 minutes.

4.9.22.5 Close CAV-445.

4.9.22.6 Close CAV-446.

4.9.22.7 Go to Step 4.8.9 to remove grab sampler.

4.9.23 Close/Check closed CAV-470.

4.9.24 Close/Check closed DWV-337.

4.9.25 Close/check closed CAV-519.

4.9.26 Close/check closed CAV-437.

4.9.27 Close/check closed CAV-447.

4.9.28 Close/check closed CAV-448.

4.9.29 Close/check closed CAV-484.

4.9.30 Close/check closed CAV-623.

4.9.31 Close/check closed CAV-624.

4.9.32 Close/check closed CAV-625.

4.9.33 Close/check closed CAV-626.

4.9.34 Close/check closed CAV-627.

4.9.35 Close/check closed CAV-628.

4.9.36 Close/check closed CAV-629.

4.9.37 Close/check closed CAV-630.

4.9.38 Close/check closed CAV-631.

4.9.39 Close/check closed CAV-632.

4.9.40 Close/check closed CAV-633.

4.9.41 Close/check closed CAV-634.

4.9.42 Close/check closed CAV-635.

4.9.43 Close/check closed CAV-525.

NOTE: The following containment isolation valves are operated from the Main Control Board.

4.9.44 Request operations CLOSE the following valves:

4.9.44.1 Close CAV-436 (Return to RB Sump, Outside Containment Valve).

4.9.44.2 Close CAV-434 (Return to RB Sump, Inside Containment Valve).

4.10 DEMINERALIZED WATER FLUSH AND SYSTEM SHUTDOWN AFTER SAMPLING DECAY HEAT FOR BORON OR GAMMA ISOTOPIC ANALYSES

4.10.1 IF the "A" DH train was sampled,
THEN close CAV-441 (Isolation for Decay Heat Train "A") OR,
IF the "B" DH train was sampled,
THEN close CAV-442 (Isolation for Decay Heat Train "B").

NOTE: These valves are operated from the Pass Analyzer Panel in the count room.

4.10.2 Place the following valves in the indicated position:

	VALVE	POSITION
4.10.2.1	CAV-440	Closed
4.10.2.2	CAV-624	Closed
4.10.2.3	DWV-337	Open
4.10.2.4	CAV-471	Open

4.10.3 Start CAP-8.

4.10.4 SLOWLY move the actuator switch on CAV-624 towards the open position, while carefully monitoring the downstream flowrate on CA-74-FI,
UNTIL the flow rate indicated on CA-74-FI is 0.35 to 0.5 GPM.

4.10.5 Allow the water to flush for 10 minutes.

4.10.6 IF a HI-HI level alarm occurs on CAT-8 (Drain tank) closing CAV-623 and stopping CAP-10,
THEN perform 4.10.6.1 through 4.10.6.7
AND continue with 4.10.7.

4.10.6.1 Place CAP-10 switch to "OFF" position.

4.10.6.2 Place CAV-623 to the "CLOSED" position.

4.10.6.3 Press and hold "RESET" button on Drain Tank level indicator (keep "HELD IN").

4.10.6.4 Turn CAP-10 switch to the "ON" position.

4.10.6.5 Hold "RESET" button "IN" until CAP-10 lowers Drain Tank level below "HI" level indicator/switch and "HI" level alarm light clears.

4.10.6.6 Place CAV-623 to the "OPEN" position.

4.10.6.7 Place CAP-10 switch to the "AUTO" position.

NOTE: A low liquid nitrogen level will automatically secure the high voltage supply to the detector. Always lower the high voltage to zero volts before resetting the liquid nitrogen monitor.

4.10.7 Ensure the A.I.M.S. is in an operable condition by:

- o Checking the liquid nitrogen monitor
- o Ensuring the high voltage supply to the detector is properly adjusted

4.10.8 Sign on the VAX computer as Username: PASS.

NOTE: The <SELECT> option is designated by the PF1 key.

4.10.9 **<SELECT>** PASS Menu.

4.10.10 Answer **"NO"** to "Do you want a spectral display window?".(Default)

4.10.11 **<SELECT>** Flush Sample Lines.

4.10.12 **<SELECT>** Sump Demin Flush.

4.10.13 The collimator will move to the correct position and the system will begin to acquire a spectrum. Maximize MCA Display 1 and toggle thru ADC's until desired configuration is shown.

NOTE: Step 4.10.14 cannot be performed from a remote terminal.

4.10.14 Use **"ERASE"** function on MCA Display to re-acquire spectrum.

4.10.15 IF a high countrate is still indicated,
THEN continue flushing.

4.10.16 IF a low stable countrate is indicated,
THEN:

4.10.16.1 Minimize MCA Display 1.

4.10.16.2 Press **<RETURN>**.

4.10.16.3 Press **<QUIT>**.

4.10.16.4 Sign off VAX computer by entering **"LO"**.

4.10.17 IF a grab sample was not performed,
THEN go to Step 4.10.19.

NOTE: These valves are operate from the PASS Analyzer Panel in the Counting Room:

4.10.18 IF a Grab Sample was performed,
THEN:

4.10.18.1 Close CAV-447.

4.10.18.2 Open CAV-445.

4.10.18.3 Open CAV-446.

4.10.18.4 Continue flush for 5 minutes.

4.10.18.5 Close CAV-445.

4.10.18.6 Close CAV-446.

4.10.18.7 Go to step 4.8.9 to remove grab sampler.

4.10.19 Close/Check closed DWV-337.

4.10.20 Close/check closed CAV-471.

4.10.21 Close/check closed CAV-519.

4.10.22 Close/check closed CAV-447.

4.10.23 Close/check closed CAV-623.

4.10.24 Close/check closed CAV-624.

4.10.25 Close/check closed CAV-625.

4.10.26 Close/check closed CAV-626.

4.10.27 Turn off CAP-8.

NOTE: The following containment isolation valves are operated from the Main Control Board.

4.10.28 Request operations CLOSE the following valves:

4.10.28.1 CAV-436 (Return to RB Sump, Outside Containment Valve).

4.10.28.2 CAV-434 (Return to RB Sump, Inside Containment Valve).

4.11 DEMIN WATER FLUSH AND SYSTEM SHUTDOWN AFTER SAMPLING MWST FOR BORON AND/OR GAMMA ISOTOPIC ANALYSES

4.11.1 Close CAV-443.

4.11.2 Close CAV-444.

4.11.3 Place the following valves in the indicated position:

NOTE: These valves are operated from the Pass Analyzer Panel in the count room.

	VALVE	POSITION
4.11.3.1	CAV-624	Closed
4.11.3.2	DWV-337	Open
4.11.3.3	CAV-471	Open

4.11.4 Start CAP-8.

4.11.5 SLOWLY move the actuator switch on CAV-624 towards the open position, while carefully monitoring the downstream flowrate on CA-74-FI,
UNTIL the flow rate indicated on CA-74-FI is 0.35 to 0.5 GPM.

4.11.6 Allow the water to flush for 10 minutes.

4.11.7 IF a HI-HI level alarm occurs on CAT-8 (Drain tank) closing CAV-623 and stopping CAP-10,
THEN perform 4.11.7.1 through 4.11.7.7
AND continue with 4.11.8.

4.11.7.1 Place CAP-10 switch to "OFF" position.

4.11.7.2 Place CAV-623 to the "CLOSED" position.

4.11.7.3 Press and hold "RESET" button on Drain Tank level indicator (keep "HELD IN").

4.11.7.4 Turn CAP-10 switch to the "ON" position.

4.11.7.5 Hold "RESET" button "IN" until CAP-10 lowers Drain Tank level below "HI" level indicator/switch and "HI" level alarm light clears.

4.11.7.6 Place CAV-623 to the "OPEN" position.

4.11.7.7 Place CAP-10 switch to the "AUTO" position.

NOTE: A low liquid nitrogen level will automatically secure the high voltage supply to the detector. Always lower the high voltage to zero volts before resetting the liquid nitrogen monitor.

4.11.8 Ensure the A I.M.S. is in an operable condition by:

- o Checking the liquid nitrogen monitor.
- o Ensuring the high voltage supply to the detector is properly adjusted.

4.11.9 Sign on the VAX computer as Username: PASS.

NOTE: The <SELECT> option is designated by the PF1 key.

4.11.10 **<SELECT>** PASS Menu.

4.11.11 Answer **"NO"** to "Do you want a spectral display window?".(Default)

4.11.12 **<SELECT>** Flush Sample Lines.

4.11.13 **<SELECT>** Sump Demin Flush.

4.11.14 The collimator will move to the correct position and the system will begin to acquire a spectrum. Maximize MCA Display 1 and toggle thru ADC's until desired configuration is shown.

NOTE: Step 4.11.15 cannot be performed from a remote terminal.

4.11.15 Use **"ERASE"** function on MCA Display to re-acquire spectrum.

4.11.16 IF a high countrate is still indicated,
THEN continue flushing.

4.11.17 IF a low stable countrate is indicated,
THEN:

4.11.17.1 Minimize MCA Display 1.

4.11.17.2 Press **<RETURN>**.

4.11.17.3 Press **<QUIT>**.

4.11.17.4 Sign off VAX computer by entering **"LO"**.

4.11.18 IF a grab sample was not performed,
THEN go to step 4.11.20.

NOTE: These valves are operate from the PASS Analyzer Panel in the Counting Room.

4.11.19 IF a Grab Sample was performed,
THEN:

4.11.19.1 Close CAV-447.

4.11.19.2 Open CAV-445.

4.11.19.3 Open CAV-446.

4.11.19.4 Continue flush for 5 minutes.

4.11.19.5 Close CAV-445.

4.11.19.6 Close CAV-446.

4.11.19.7 Go to step 4.8.9 to remove grab sampler.

4.11.20 Close/Check closed DWV-337.

4.11.21 Close/check closed CAV-471.

4.11.22 Close/check closed CAV-519.

4.11.23 Close/check closed CAV-447.

4.11.24 Close/check closed CAV-623.

4.11.25 Close/check closed CAV-624.

4.11.26 Close/check closed CAV-625.

4.11.27 Close/check closed CAV-626.

4.11.28 Turn off CAP-8.

NOTE: The following containment isolation valves are operated from the Main Control Board.

4.11.29 Request operations CLOSE the following valves:

4.11.29.1 CAV-436 (Return to RB Sump, Outside Containment Valve).

4.11.29.2 CAV-434 (Return to RB Sump, Inside Containment Valve).

4.12 DEMIN WATER FLUSH AND SYSTEM SHUTDOWN AFTER SAMPLING THE RB SUMP FOR BORON AND/OR GAMMA ISOTOPIC ANALYSES

4.12.1 Close CAV-433.

4.12.2 Close CAV-435.

4.12.3 Place the following valves in the indicated position:

NOTE: These valves are operated from the Pass Analyzer Panel in the count room.

	VALVE	POSITION
4.12.4	CAV-624	Closed
4.12.5	DWV-337	Open
4.12.6	CAV-471	Open

4.12.7 Start CAP-8.

4.12.8 SLOWLY move the actuator switch on CAV-624 towards the open position, while carefully monitoring the downstream flowrate on CA-74-FI,
UNTIL the flow rate indicated on CA-74-FI is 0.35 to 0.5 GPM.

4.12.9 Allow the water to flush for 10 minutes.

4.12.10 IF a HI-HI level alarm occurs on CAT-8 (Drain tank) closing CAV-623 and stopping CAP-10,
THEN perform 4.12.10.1 through 4.12.10.7
AND continue with 4.12.11.

4.12.10.1 Place CAP-10 switch to "OFF" position.

4.12.10.2 Place CAV-623 to the "CLOSED" position.

4.12.10.3 Press and hold "RESET" button on Drain Tank level indicator (keep "HELD IN").

4.12.10.4 Turn CAP-10 switch to the "ON" position.

4.12.10.5 Hold "RESET" button "IN" until CAP-10 lowers Drain Tank level below "HI" level indicator/switch and "HI" level alarm light clears.

4.12.10.6 Place CAV-623 to the "OPEN" position.

4.12.10.7 Place CAP-10 switch to the "AUTO" position.

NOTE: A low liquid nitrogen level will automatically secure the high voltage supply to the detector. Always lower the high voltage to zero volts before resetting the liquid nitrogen monitor.

4.12.11 Ensure the A.I.M.S. is in an operable condition by:

- o Checking the liquid nitrogen monitor.
- o Ensuring the high voltage supply to the detector is properly adjusted.

4.12.12 Sign on the VAX computer as Username: PASS.

NOTE: The <SELECT> option is designated by the PF1 key.

4.12.13 **<SELECT>** PASS Menu.

4.12.14 Answer **"NO"** to "Do you want a spectral display window?".(Default)

4.12.15 **<SELECT>** Flush Sample Lines.

4.12.16 **<SELECT>** Sump Demin Flush.

4.12.17 The collimator will move to the correct position and the system will begin to acquire a spectrum. Maximize MCA Display 1 and toggle thru ADC's until desired configuration is shown.

NOTE: Step 4.12.18 cannot be performed from a remote terminal.

4.12.18 Use **"ERASE"** function on MCA Display to re-acquire spectrum.

4.12.19 IF a high countrate is still indicated,
THEN continue flushing.

4.12.20 IF a low stable countrate is indicated,
THEN:

4.12.20.1 Minimize MCA Display 1.

4.12.20.2 Press **<RETURN>**.

4.12.20.3 Press **<QUIT>.**

4.12.20.4 Sign off VAX computer by entering **"LO"**.

4.12.21 IF a grab sample was not performed,
THEN go to step 4.12.23.

NOTE: These valves are operate from the PASS Analyzer Panel in the Counting Room.

4.12.22 IF a Grab Sample was performed,
THEN:

4.12.22.1 Close CAV-447.

4.12.22.2 Open CAV-445.

4.12.22.3 Open CAV-446.

4.12.22.4 Continue flush for 5 minutes.

4.12.22.5 Close CAV-445.

4.12.22.6 Open CAV-446.

4.12.22.7 Go to step 4.8.9 to remove grab sampler.

4.12.23 Close/Check closed DWV-337.

4.12.24 Close/check closed CAV-471.

4.12.25 Close/check closed CAV-519.

4.12.26 Close/check closed CAV-447.

4.12.27 Close/check closed CAV-623.

4.12.28 Close/check closed CAV-624.

4.12.29 Close/check closed CAV-625.

4.12.30 Close/check closed CAV-626.

4.12.31 Turn off CAP-8.

NOTE: The following containment isolation valves are operated from the Main Control Board.

4.12.32 Request operations CLOSE the following valves:

4.12.32.1 CAV-436 (Return to RB Sump, Outside Containment Valve).

4.12.32.2 CAV-434 (Return to RB Sump, Inside Containment Valve).

4.13 NOTIFICATIONS

4.13.1 All data accumulated per this procedure is to be summarized on Enclosure 3 and forwarded to the Emergency Coordinator via Chemistry Supervision on Enclosure 8.

4.13.2 All personnel leaving the general assembly area for the purpose of sampling the Reactor Coolant System per this procedure are to be listed on Enclosure 4 which is to be forwarded to the Emergency Coordinator.

ENCLOSURE 1

ALTERNATE CONTAINMENT ISOLATION SAMPLE VALVES

Sample	Alternate Valves
CAV-434* CAV-436*	CAV-433* CAV-435* Note a crosstie valve CAV-500 (Intermediate Bldg. Elev. 95') must be opened to utilize this crosstie.
CAV-431	CAV-432*
CAV-126	CAV-429* RCP 1A Disch. CAV-430* RCP 1C Disch.
CAV-126	CAV-001 PZR STM Space CAV-003 PZR Water Space

*NOTE: Breaker is normally locked open.

1. 0.025 N sulfuric acid (H_2SO_4) Molecular weight 98.06g.
   Pipet 700ul of concentrated H_2SO_4, into 500ml reagent grade water and dilute to 1 liter.
2. Eluent #3 stock solution - [0.22 M sodium carbonate (Na_2CO_3)/0.075 M sodium bicarbonate ($NaHCO_3$)] Dissolve 6.30 g $NaHCO_3$ and 23.3 g Na_2CO_3 in ~ 800 ml reagent grade water and dilute to the mark in a 1 liter volumetric flask.
3. Eluent #3 - [0.0022 M sodium carbonate (Na_2HCO_3)/0.00075 M sodium bicarbonate ($NaHCO_3$)] Pipet 10 ml of 0.22 M Na_2CO_3/0.075 M $NaHCO_3$ eluent concentrate into a 1 liter volumetric flask and dilute to the mark with reagent grade water.
4. Eluent #1 - [0.005 M sodium tetraborate ($Na_2B_4O_7 \cdot 10\ H_2O$)] For each liter of eluent to be prepared dissolve 1.91 grams $Na_2B_4O_7 \cdot 10\ H_2O$ in ~ 500 ml reagent grade water and dilute to the mark in a 1 liter volumetric flask.
5. Calibration Standards (F^-, Cl^-, SO_4^{-2}, etc.). All standards should be prepared from commercially available aqueous stock solutions or from the sodium/salts of the anions of interest. Some common stock solutions are prepared as follows:
   Chloride - 0.165 g NaCl diluted to 1ℓ is 100 ppm Cl^-.
   Fluoride - 0.221 g NaF diluted to 1ℓ is 100 ppm F^-.
   Sulfate - 0.148 g Na_2SO_4 diluted to 1ℓ is 100 ppm SO_4^{-2}.

NOTE: Chloride & Fluoride standards should be prepared in glassware cleared in nitric acid and rinsed thoroughly in reagent grade water.

NOTE: Calibration Standard concentrations will be determined based on accident scenario.

P.A.S.S. DATA SHEET

DATE: _____

TIME: _____

AIMS ANALYSIS

Sample Point: ☐ RCS, ☐ DH, ☐ RB Sump, ☐ MWST

Total Activity (uCi/cc) from report above, if applicable _____

Major Contributing Isotopes from report, if applicable:

_____ uCi/cc, _____ uCi/cc, _____ uCi/cc, _____ uCi/cc

_____ uCi/cc, _____ uCi/cc, _____ uCi/cc, _____ uCi/cc

_____ uCi/cc, _____ uCi/cc, _____ uCi/cc, _____ uCi/cc

Chemistry Analysis

☐ Boron_____ppm	☐ pH_____	☐ Chloride_____ppm
☐ Hydrogen_____% or $^{cc}/_{kg}$	☐ Total Gas_____ $^{cc}/_{kg}$	☐ _____
☐ _____	☐ _____	☐ _____
☐ _____	☐ _____	☐ _____
☐ _____	☐ _____	☐ _____

_____
SIGNATURE / TITLE

ENCLOSURE 4

POST-ACCIDENT SAMPLING OF RCS, RB SUMP AND MWST, EMERGENCY COORDINATOR NOTIFICATION*

List of Personnel Performing Entry For Sample Acquisition:

Name	Title	TLD#	Dose Margin
1.			
2.			
3.			
4.			
5.			

Date/Time of Entry (projection): _____/_____

"Working Copy" of EM-307 available/reviewed. Initials _____

Sample(s) to be collected (list)

1.

2.

3.

Applicable isolation valve breakers per Enclosure 7 energized.

Initials _____

Sample Collection route discussed. Initials _____

Dose Limits/Radiological Conditions discussed. Initials _____

Communication Techniques discussed.

TSC Phone Number _____

Radio check performed on Channel - _____ Initials _____

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*To be completed prior to leaving the general assembly area.

For the purpose of sampling the Reactor Coolant System under EM-307.

To be completed by Nuclear Chemistry Supervisor or designee.

ENCLOSURE 5

RECOMMENDED SAMPLE FLUSH TIMES

Sample Point	.25 gpm Flow	.50 gpm Flow
*Reactor Coolant Letdown	2 hr, 56 min	1 hr, 28 min
Reactor Coolant Loop A	8 min	4 min
Reactor Coolant Loop B	12 min	6 min
Reactor Building Sump	34 min	17 min
Decay Heat	6 min	3 min
Miscellaneous Waste Storage Tank	4 min	2 min
Reactor Coolant Letdown	40 min	35 min
PZR Water Space	10 min	5 min
PZR STM Space	30 min	15 min

*This sample flush time is based on zero letdown flow.

PRIMING THE ANALYTICAL PUMP OF THE DIONEX 2010 I.C.

1. STOP the analytical pump.

2. Insure the correct eluent selector switch has been energized.

3. To the left of the analytical pump is a black block valve with a handle on top and a connector for a 50cc plastic syringe. Connect a 50cc syringe to the block valve and align the valve handle to point down the length of the syringe.

4. Slowly withdraw the syringe plunger. This should draw eluent from the eluent bottle into the syringe as well as air from the eluent supply line.

5. Disconnect the syringe from the block valve and expel all air from the syringe. Reconnect the syringe.

6. Loosen the round black knob that covers the analytical pump outlet two full turns counterclockwise. This opens the drain line from the pump.

7. Depress the plunger on the syringe forcing the eluent into the pump. It should flow thru the pump and to waste carrying the air from the pump with it.

8. Tighten the cover knob to close the drain line and return the handle on the block valve to its normal position (perpendicular to the syringe). Restart the pump. If pressure will not stabilize repeat 7.8.1 through 7.8.7 until all air is expelled from the pump.

MAIN POWER SUPPLY'S FOR POST ACCIDENT SAMPLE/NOBLE GAS UPGRADE SYSTEMS

Location	Panel No.	Breaker No.	Power To
119' Aux. Bldg.	MCC 3B1	8BR	37.5 KVA Transformer Elgar UPS & ACDP 59
119' Aux. Bldg.	ESMCC 3A2	6BR	Pump WSP-1
95' Aux. Bldg.	ACDP-59	1	CMP RANGE Mimic Panel
95' Aux. Bldg.	ACDP-59	2	RMP PASS Mimic Panel
95' Aux. Bldg.	ACDP-59	3	AIMS PASS #1 Cabinet
95' Aux. Bldg.	ACDP-59	4	AIMS RANGE #2 Cabinet
95' Aux. Bldg.	ACDP-59	9	ABV Range Manifold
95' Aux. Bldg.	ACDP-59	10	RBV Range Manifold
95' Aux. Bldg.	ACDP-59	11	Boron/pH/Chloride Reagent Panel
95' Aux. Bldg.	ACDP-59	13	ISP Instrument Sensor Panel
95' Aux. Bldg.	ACDP-59	15	Sample Valve Relay Box
95' Aux. Bldg.	ACDP-59	16	Sample Room Exhaust Fan
95' Aux. Bldg.	ACDP-59	17	Main Junction Box (Computer AC TBI-7 & 8)

POST ACCIDENT SAMPLE/NOBLE GAS UPGRADE SYSTEMS

Location	Panel No.	Breaker No.	Power To
95' Aux. Bldg.	ACDP-59	18	Main Junction Box (TBI-7 & 8)
124' Control Complex	DPDP-4B	11	D.C. power to non-Control Rod Drive Rm containment isolation valves operated by the PASS/Noble Gas MIMIC Panels
145' Main Control Rm	ACDP-52	39	A.C. power to ABV, RBV (between Main Control Mid, High Range Panels) Victooreen Monitors
124' Control Complex 480V Switchgear Rm.	DPDP-5A	27*	CAV-429, CAV-430, CAV-433, CAV-434
124' Control Complex 480V Switchgear Rm.	DPDP-5B	8*	CAV-435, CAV-436, CAV-432
124' Control Complex 480V Switchgear Rm.	DPDP-5B	2	CAV-431

*NOTE: These breakers are normally locked open.

T. S. C. DATA SHEET

DATE: _____

TIME: _____

AIMS ANALYSIS RADIO CHECK: SAT UNSAT

Sample Point: ☐ RCS, ☐ DH, ☐ RB Sump, ☐ MWST

Total Activity (uCi/cc) from report above, if applicable _____

Major Contributing Isotopes from report, if applicable:

_____ uCi/cc, _____ uCi/cc, _____ uCi/cc, _____ uCi/cc

_____ uCi/cc, _____ uCi/cc, _____ uCi/cc, _____ uCi/cc

_____ uCi/cc, _____ uCi/cc, _____ uCi/cc, _____ uCi/cc

Chemistry Analysis

☐ Boron_____ppm	☐ pH_____	☐ Chloride_____ppm
☐ Hydrogen_____% or $^{cc}/_{kg}$	☐ Total Gas_____ $^{cc}/_{kg}$	☐ _____
☐ _____	☐ _____	☐ _____
☐ _____	☐ _____	☐ _____
☐ _____	☐ _____	☐ _____

SP4400 INTEGRATOR PASS CALIBRATION FILE EXAMPLE

```
MN = 5.        REM   FE=   2.       CH= "A"   PS=   1.

NM   = "PASS "


PW   = 6.              PT   = 5000.        RN   = 1.
IX   = 12.             OD   = 1.           PH   = 1
TB   = 0.              CW   = 0.1          CZ   = 1.
EC   = 1.              LC   = 0.           LS   = 0.
NV   = 0.              SI   = 0            RC   = 0
CI   = 254             SP   = 8

TT(1)=    0.01         TF(1)="PM"          TV(1)=    1.
TT(2)=    0.01         TF(2)="II"          TV(2)=    1.
TT(3)=    1.75         TF(3)="AZ"          TV(3)=    1.
TT(4)=    4            TF(4)="II"          TV(4)=    0.
TT(5)=    6            TF(5)="ER"          TV(5)=    1.


RT(1)=    4.58         CN(1)="CHLOR"       CM(1)= "IDE  "
RF(1)=8651.


CU   = "     "         CU(1)= "PPB  "
```

4270 INTEGRATOR PASS CALIBRATION FILE EXAMPLE

```
MN = 5.        REM   FE=   3.       CH= "A"   PS=   1.

NM   = "PASS "       NM(1)= "CALIB"     NM(2)= "RATIO"
NM(3)= "N    "

PW   = 6.            PT   = 3000.       RN   = 1.
IX   = 2.            OD   = 1.          PH   = 0.
TB   = 0.            CW   = 0.1         CZ   = 1.
LS   = 0.            NV   = 0.          SI   = 0.
RC   = 0.

TT(1)=    0.01       TF(1)="PM"         TV(1)=    1.
TT(2)=    0.1        TF(2)="AZ"         TV(2)=    1.
TT(3)=    6.         TF(3)="ER"         TV(3)=    1.

RT(1)=    4.6        CN(1)="CHLOR"      CM(1)= "IDE  "
RF(1)=19960.

AN   = "CHEMI"       AN(1)= "STRY "     AN(2)= "TECH  "

CU   = "     "       CU(1)= "PPB  "
```

Los Alamos
Los Alamos National Laboratory
101 Convention Center Drive, Suite 820
Las Vegas, NV 89109

WBS 1.2.6.1.1, 1.2.3.9.7
"QA N/A"

memorandum

LA-EES-13-LV-05-94-011
Page 1 of 5

May 9, 1994
702/794-7095
M/S 527

TO: S. B. Jones, DOE/YMSCO
W. B. Simecka, DOE/YMSCO

FROM: R. D. Oliver, LANL

SUBJECT: EXPLORATORY STUDIES FACILITY TESTING ACTIVITIES - APRIL 1994 - MONTHLY PROGRESS REPORT (SCPB: N/A)

I-3565

GENERAL EXPLORATORY STUDIES FACILITY ACTIVITIES

TEST PROGRAM: EXECUTIVE SUMMARY

Cleaning and logging activities continued in the long radial boreholes in Test Alcove #1. The completion of drilling operations for the Large Block Tests and the continuation of construction at the Exploratory Studies Facility (ESF) North Portal Pad was also conducted in April. Other Job Package (JP) activities involved Sandia National Laboratories' (SNL) Field Team with Construction Monitoring. The Test Planning Package (TPP), JP, and Work Package (WP) for the Radial Borehole Test are in review. Comments have been received from the U.S. Geological Survey (USGS) which represent new test support requirements (instrument-grade power and 0.01 micron filtration on compressed air for testing). Additional planning information will be required from the USGS in order to define implementation options and associated costs; this process may delay test implementation. Scheduled progress consistent with the ESF Design is illustrated in Attachment 1.

INITIATIVES

Preliminary results from the Core Packaging study are being analyzed to determine general trends. Some problem areas have already been identified and addressed. A visit to the Test Coordination Office (TCO) by Dr. Claude Degueldre was sponsored by Alan Mitchell. Dr. Degueldre presented a discussion regarding "Colloid Transport at Yucca Mountain."

FIELD ACTIVITIES

Field Activities are detailed in appendices attached to this report. Each of the appendices contains a description of the progress in milestones and deliverables, a summary of field activities, a brief description of the manner of data flow,

102.8
WM-11
NH03

and a schedule. When pertinent, additional graphic information is provided to illustrate progress or concerns.

INTEGRATED DATA SYSTEM (IDS)

Work continues on identifying and evaluating the various possible approaches to meet the principal investigators' data acquisition needs in a timely and cost effective manner. The evaluation of the ramifications of the recent decision to combine the present IDS functions with the Control System (CS) functions in a new system called the Integrated Data/Control System (ID/CS) began this month. The TCO continued to provide input and assistance to Civilian Radioactive Waste Management System & Operating (CRWMS M&O) Contractor IDS Design team in their preparation of ID/CS Design requirements document this month.

ENVIRONMENTAL, SAFETY AND HEALTH (ES&H) ACTIVITIES

The ESF Safety Coordinator prepared the mid-year status and review of safety budget WBS 1.2.6 and 1.2.13, and it was submitted to the U.S. Department of Energy (DOE). The ESF Safety Coordinator conducted the April general safety meeting. A report on 'miles driven per accident' from Los Alamos National Laboratory (LANL) was submitted to DOE.

Tracer water used underground by Reynolds Electrical & Engineering Company, Inc. (REECo) for April totaled 10.7 kiloliters (2,835 gallons), showing a total usage of 1,752.6 kiloliters (462,985 gallons).

SITE CONSTRUCTION

JOB PACKAGE (JP) 92-20 ESF NORTH PORTAL PAD AND FACILITIES

Construction at the ESF continued this month with REECo preparing the ESF for construction of the concrete invert and launch chamber. The radon monitoring in Test Alcove #1 by Science Applications International Corporation (SAIC) was completed. REECo and CRWMS M&O completed pull-tests of various types of rockbolts and grouts in the starter tunnel. An inspection of the highwall and tunnel by representatives from the CRWMS M&O, LANL, SNL, and REECo found conditions consistent with previous inspections. SNL installed an additional set of convergence pins in the Starter Tunnel, located approximately 11.6 meters (38 ft) from the entrance, to monitor some small cracks in the fibercrete.

Appendix I - Geologic Mapping of the ESF (JP 92-20A)
Appendix II - Perched Water Testing in the ESF (JP 92-20B)
Appendix III - Consolidated Sampling in the ESF (JP 92-20C)
Appendix IV - Construction Monitoring in the ESF (JP 92-20D)
Appendix V - Engineered Barrier - Fran Ridge Large Block Experiment (JP 93-10)
Appendix VI - Hydrochemistry (JP 92-20E)

ADMINISTRATIVE SCHEDULE AND SUMMARY TABLE

Table I identifies the field activities in progress at the ESF. The Administrative Schedule (Attachment 1) is based on information provided by the ESF Design Team.

TABLE I
ESF Testing Field Activity
North Ramp Starter Tunnel

SCP PROGRAM NAME	SCP STUDY NAME	SCP STUDY PLAN NUMBER	TEST NAME (SCP ACTIVITY)	WBS ELEMENT	TCO TEST EVENT NAME	TPP #	JP #
Rock Characteristic Program	Characterization of Structural Features in the Site Area	8.3.1.4.2.2	Underground Geologic Mapping	1.2.3.2.2.1.2	Geologic Mapping - ESF	TPP 92-10	JP 92-20A
Geohydrology Program	Characterization of Yucca Mountain Unsaturated-Zone in the ESF	8.3.1.2.2.4	Perched Water Testing in the ESF	1.2.3.3.1.2.4	Perched Water - (Contingency)	TPP 92-11	JP 92-20B
			Hydrochemistry Tests in the ESF	1.2.3.3.1.2.4	Hydrochemistry Testing	TPP 92-12	JP 92-20E
			Radial Borehole Tests in the ESF	1.2.3.3.1.2.4	Radial Borehole Testing	TPP 92-13	JP 92-20F
Thermal and Mechanical Rock Properties Program	In Situ Design Verification	8.3.1.15.1.8	Evaluation of Mining Methods	1.2.4.2.1.1.4	Construction Monitoring - ESF	TPP T-93-2	JP 92-20D
			Monitoring of Ground Support Systems	1.2.4.2.1.1.4			
Geochemistry Program	Water Movement Test	8.3.1.2.2.2	Chloride and Chlorine-36 Measurements of Percolation at Yucca Mountain	1.2.3.3.1.2.2	Consolidated Sampling - ESF	TPP 92-14	JP 92-20C
	Study Plan for History of Mineralogic Alteration of Yucca Mountain	8.3.1.3.2.2	History of Mineralogic and Geochemical Alteration of Yucca Mountain	1.2.3.2.1.1.2			
	Study Plan for Mineralogy, Petrology, and Chemistry of Transport Pathways	8.3.1.3.2.1	Mineral Distributions Between Host Rock and Accessible Environment	1.2.3.2.1.1.1			
	Study Plan for Mineralogy, Petrology, and Chemistry of Transport Pathways	8.3.1.3.2.1	Fracture Mineralogy	1.2.3.2.1.1.1			
Repository Horizon Rock-Water Interaction Large Block Experiment	Engineered Barrier System Field Tests	8.3.4.2.4.4	Repository Horizon Rock-Water Interaction	1.2.2.2.4	Engineered Barrier-Fran Ridge Large Block Experiment	NA	JP 93-10

ISSUES: None

Attachments "Limited Value Material"

RDO:MKL:dm14

Cy: W. J. Boyle, DOE/YMSCO, MS 523
R. A. Crawley, DOE/YMSCO, MS 523
J. R. Dyer, DOE/YMSCO, MS 523
V. F. Iorii, DOE/YMSCO, MS 523
E. H. Petrie, DOE/YMSCO, MS 523
K. J. Skipper, DOE/YMSCO, MS 523
M. W. Smith, DOE/YMSCO, MS 523
D. P. Stucker, DOE/YMSCO, MS 523
R. S. Waters, DOE/YMSCO, MS 523
R. J. White, DOE/YMSCO, MS 523
D. R. Williams, DOE/YMSCO, MS 523
W. A. Girdley, DOE/FOC, MS 717
W. A. Wilson, DOE/FOC, MS 717
W. C. Kopatich, RSN, MS 403
E. L. Wright, RSN, MS 403
B. R. Gardella, REECo, MS 408
R. C. McDonald, CRWMS M&O, MS 423
R. W. Craig, USGS/LV, MS 509
D. L. Edwards, USGS/LV, MS 509
L. R. Hayes, USGS, Denver, CO
M. D. Voegele, SAIC, MS 517
D. S. Kessel, SNL/LV, MS 509
L. E. Shephard, SNL, Dept. 6302, Albuquerque, NM
J. A. Blink, LLNL/LV, MS 465
W. L. Clarke, LLNL, Livermore, CA
J. A. Canepa, LANL, EES-13, MS J521
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N. Z. Elkins, LANL, EES-13/LV, MS 527
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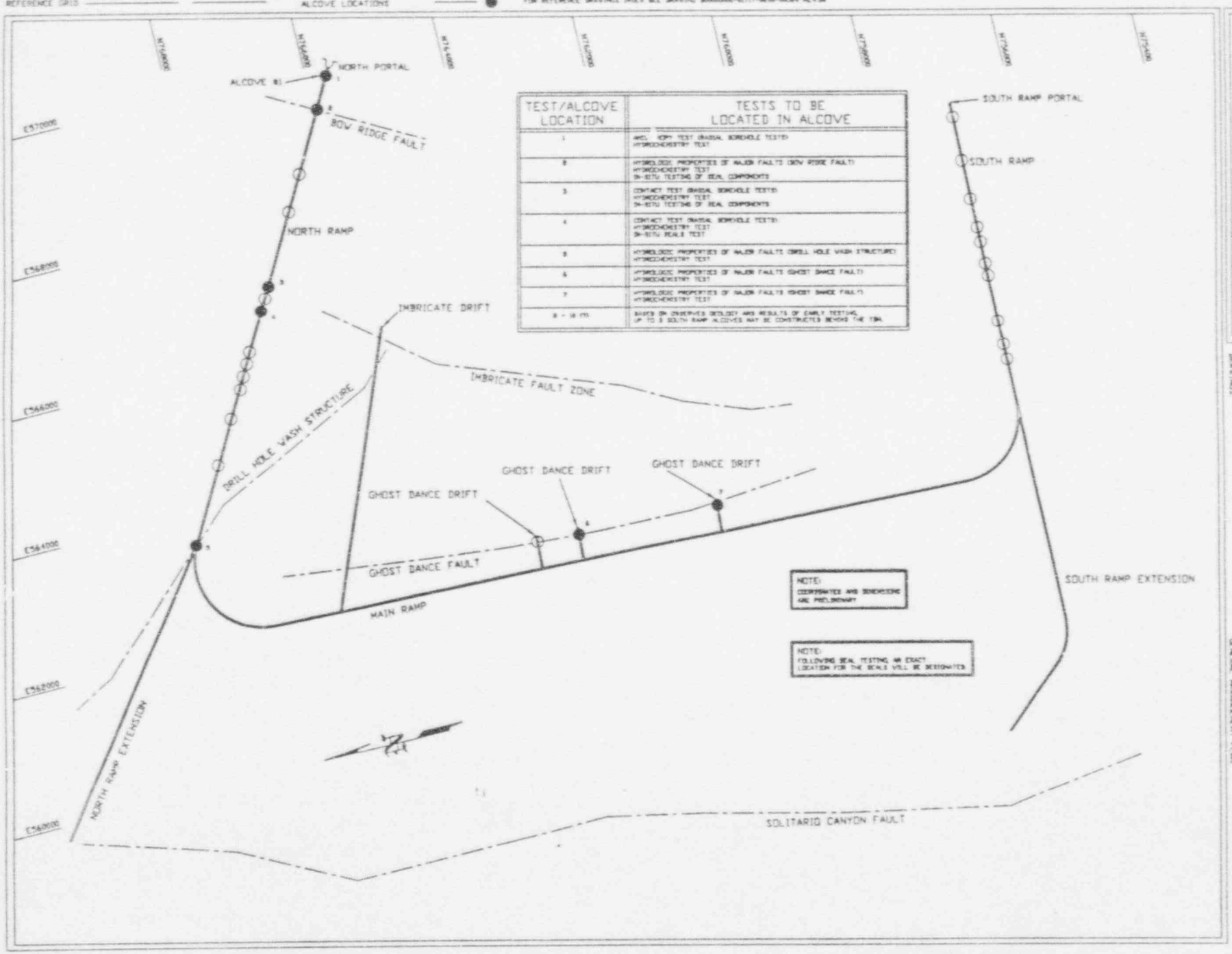
M. L. Lawson, LANL, EES-13/LV, MS 527
A. J. Mitchell, LANL, EES-13/LV, MS 527
D. J. Weaver, LANL, EES-13/LV, MS 527
J. H. Berry, LANL/FOC, MS 735
R. G. Kovach, LANL/FOC, MS 735
EES-13/LV, LANL, MS 527

LA-EES-13-LV-05-94-011
Attachment 1
3 Pages



TEST/ALCOVE LOCATION	TESTS TO BE LOCATED IN ALCOVE
1	AMS, VERT TEST (RADIAL BOREHOLE TESTS) HYDROCHEMISTRY TEST
2	HYDROLOGIC PROPERTIES OF MAJOR FAULTS (BOW RIDGE FAULT) HYDROCHEMISTRY TEST IN-SITU TESTING OF SEAL COMPONENTS
3	CONTACT TEST (RADIAL BOREHOLE TESTS) HYDROCHEMISTRY TEST IN-SITU TESTING OF SEAL COMPONENTS
4	CONTACT TEST (RADIAL BOREHOLE TESTS) HYDROCHEMISTRY TEST IN-SITU SEALS TEST
5	HYDROLOGIC PROPERTIES OF MAJOR FAULTS (DRILL HOLE WASH STRUCTURE) HYDROCHEMISTRY TEST
6	HYDROLOGIC PROPERTIES OF MAJOR FAULTS (GHOST DANCE FAULT) HYDROCHEMISTRY TEST
7	HYDROLOGIC PROPERTIES OF MAJOR FAULTS (GHOST DANCE FAULT) HYDROCHEMISTRY TEST
8 - 10 (?)	BASED ON OBSERVED GEOLOGY AND RESULTS OF EARLY TESTING, UP TO 3 SOUTH RAMP ALCOVES MAY BE CONSTRUCTED BEYOND THE TBM

LOS ALAMOS NATIONAL LABORATORY
TEST COORDINATION OFFICE - YUCCA MOUNTAIN PROJECT
PROJECT: RAMP AND DRIFT CONFIGURATION - ALCOVE LOCATION ILLUSTRATION
CAD FILE/DRAWING: AUTOCAD REL [ ] | SCALE: NOTED | REVISION: A1
DRN. BY: SLS 3/14/94 | APPROVED BY: ON FILE | DATE DRN: 3/13/94
NOTES: ADMINISTRATIVE/ILLUSTRATIVE USE ONLY
PLOT DATE: 3/14/94

Enclosure 2

COMMENTS:
NORTH PORTAL BOX CUT FACE AT CS 8+00
ALCOVE #1 APPROXIMATELY LOCATED AT CS 1+40

FAULT TRACE LOCATIONS, EXCEPT FOR THE BOW RIDGE FAULT, ARE APPROXIMATIONS BASED ON AT-DEPTH PROJECTIONS OF INFORMATION FROM LOCAL OPEN FIELD REPORT 81-494, PRELIMINARY GEOLOGIC MAP AND SECTIONS, BY SCOTT AND BONK. THE BOW RIDGE FAULT TRACE IS AN AT-DEPTH PROJECTION BASED ON PRELIMINARY FIELD WORK FROM ON-GOING ROCK AND SOIL INVESTIGATIONS.

ILLUSTRATION BASED ON M&O DRAWING 8XXXXXXXX-01(?)-PUR(-XXXX)-02 "EXPLORATORY STUDIES FACILITY PACKAGE 2A OVERALL SURFACE ARRANGEMENT PLAN"

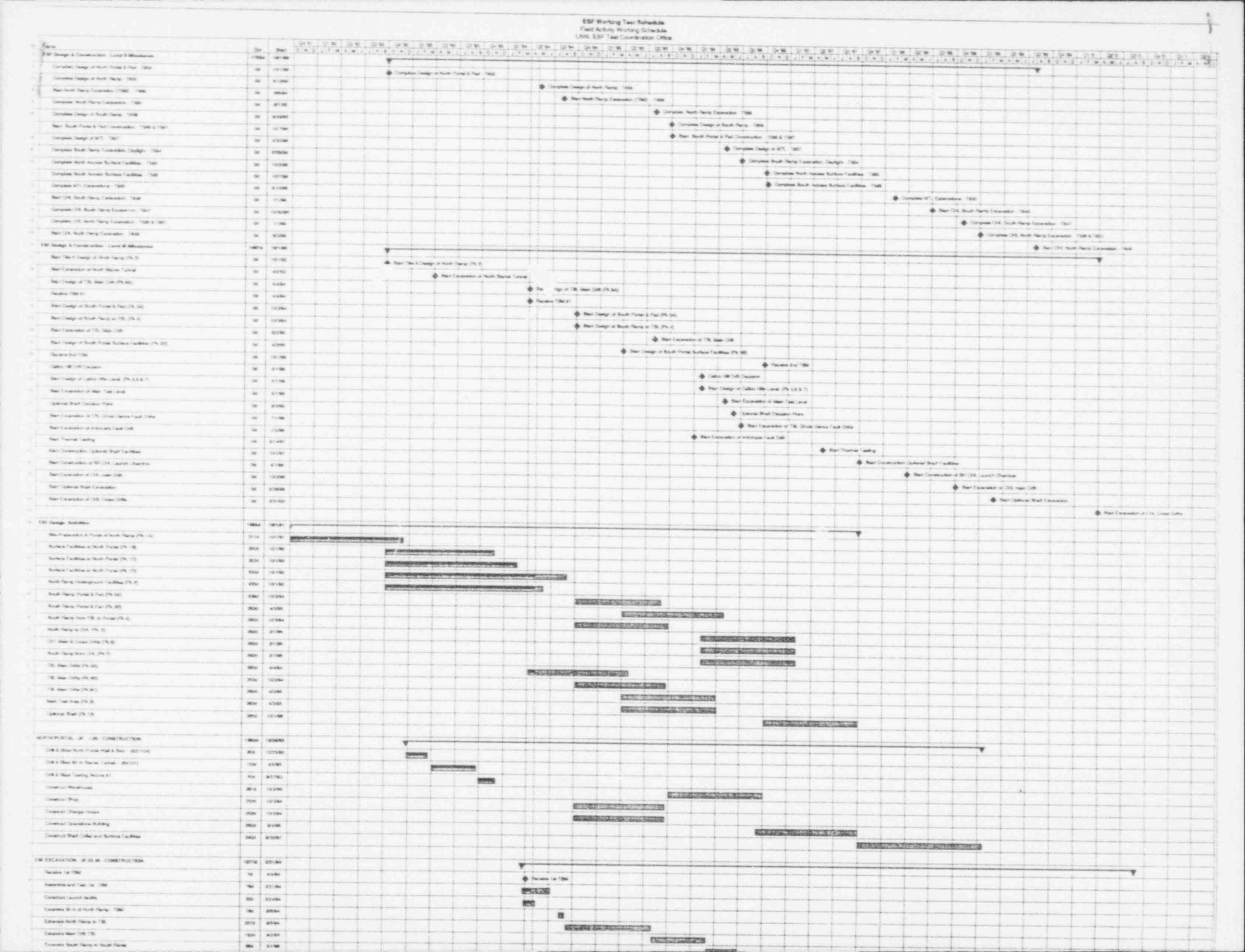
STARTER TUNNEL CONFIGURATION AND AZIMUTH FOR THE FIRST 60.960 m (200 FT) IS BASED ON TITLE II PACKAGE 1A DESIGN DRAWINGS

ALCOVE LOCATIONS AND DIMENSIONS ARE PRELIMINARY AND SUBJECT TO REVISION BASED ON FIELD CONDITIONS AND APPROVALS

THE BASIS FOR THE TEST ALCOVE LOCATIONS IS THE ESF SH TRD/CC-0013 REV 5/31-91

EXISTING DRILLHOLE LOCATIONS ARE BASED ON FIELD SURVEYS CONTAINED IN THE YUCCA MOUNTAIN PROJECT DATA BASE

ESF Working Test Schedule
Field Activity Working Schedule
LANL ESF Test Coordination Office



9406070272-01

GEOLOGIC MAPPING OF THE ESF

PROGRESS - MILESTONES AND DELIVERABLES

The geologic mapping data collection activity started with starter tunnel construction.

SUMMARY OF FIELD ACTIVITIES

No geologic mapping took place this month.

DATA FLOW INFORMATION

Analysis of geologic mapping field data by investigating organizations is ongoing. The information from the Starter Tunnel and Test Alcove #1 is being processed, and has been shared with the constructor, facility design teams, and construction management.

SCHEDULE SUMMARY

The costs and progress estimates on this activity are within the scope set by JP 92-20A.

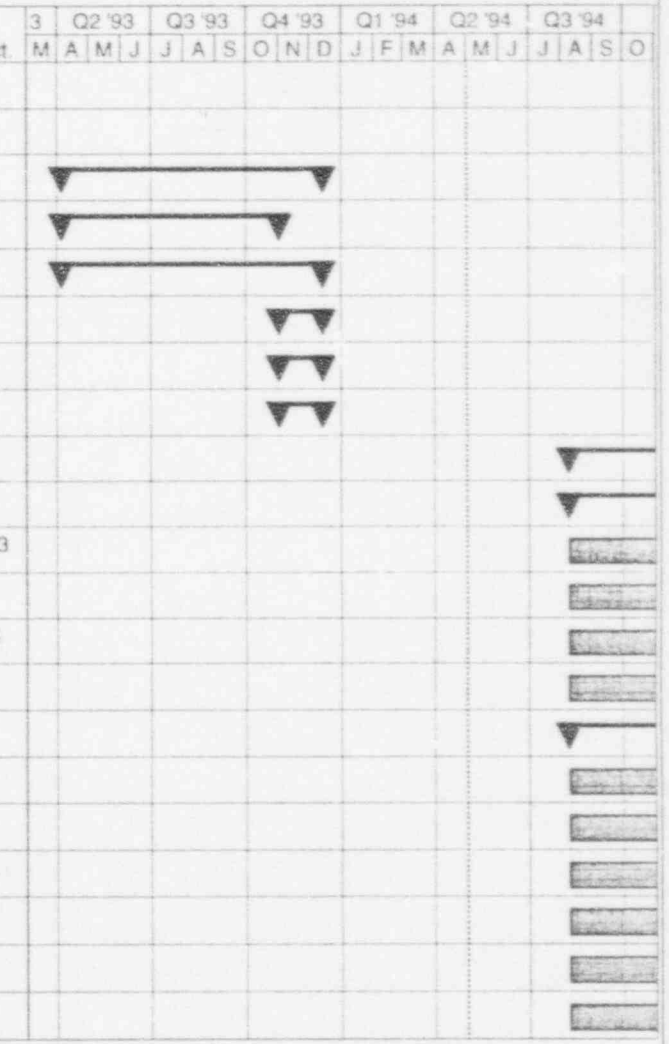
SCP PROGRAM NAME	SCP STUDY NAME	SCP STUDY PLAN NUMBER	TEST NAME (SCP ACTIVITY)	TPP #	JP #
Rock Characteristic Program	Characterization of Structural Features in the Site Area	8.3.1.4.2.2	Underground Geologic Mapping	TPP 92-10	JP 92-20A

Geologic Mapping (TPP 92-10/JP 92-20A)

Field Activity Working Schedule

LANL ESF Test Coordination Office

ID	Name	Dur	Start	Summary Acct.
1	GEOLOGIC MAPPING	1923d	4/5/93	
2				
3	STARTER TUNNEL	181d	4/5/93	
4	Test Implementation - Discrete	151d	4/5/93	
10	Test Implementation - Matrix Support	181d	4/5/93	
17	STARTER TUNNEL ALCOVE	31d	11/1/93	
18	Test Implementation - Discrete	31d	11/1/93	
23	Test Implementation - Matrix Support	31d	11/1/93	
30	RAMPS & MAIN	1573d	8/8/94	
31	Test Implementation - Discrete	1573d	8/8/94	
32	USGS/USBR Test Implementation (*1)	1573d	8/8/94	OG32212D93
33	RSN Field Survey & Processing	1573d	8/8/94	RS3522N4
34	REECo Test Construction & Procurement	1573d	8/8/94	OR32212L4
35	JC Photography & Process	1573d	8/8/94	OP355L94
36	Test Implementation - Matrix Support	1573d	8/8/94	
37	Los Alamos TCO Coordination & Planning (Field Test Coordination Support)	1573d	8/8/94	OA310BL4
38	Los Alamos TCO Test Management (Project Engineer Support)	1573d	8/8/94	OA616AL4
39	T&MSS Direct Support Services (Photo Support)	1573d	8/8/94	OT3522EL
40	REECo Construction & Operations Support	1573d	8/8/94	OR682L4
41	RSN Survey Support / Capital Procurement (Interim WBS)	1573d	8/8/94	RS614P94
42	CRWMS M&O Networking & Baseline Planning Support (Network & Progress Rpts.)	1573d	8/8/94	TR921CA1



Project: Geologic Mapping (TPP 92-10/JP 92-20A)
Date: 4/30/94
Revision #1

Critical — Noncritical — Progress — Milestone — Summary — Rolled Up

Checked by: _____

Approved by: _____

T9210TLMPP

ADMINISTRATIVE USE ONLY

PERCHED WATER TESTING IN THE ESF

PROGRESS - MILESTONES AND DELIVERABLES

The ESF perched water data collection contingency activity began with starter tunnel construction.

SUMMARY OF FIELD ACTIVITIES

Moisture was observed on the drill string during cleaning of the lower right hole in Test Alcove #1. The USGS was contacted. After evaluating the situation, it was determined that the moisture was due to higher than normal humidity resulting in condensation on the drill string. Consequently, no water or samples were collected during the period. Equipment to collect samples, if identified, is on station.

DATA FLOW INFORMATION

Perched water sample data and observances will be recorded in a scientific notebook if encountered.

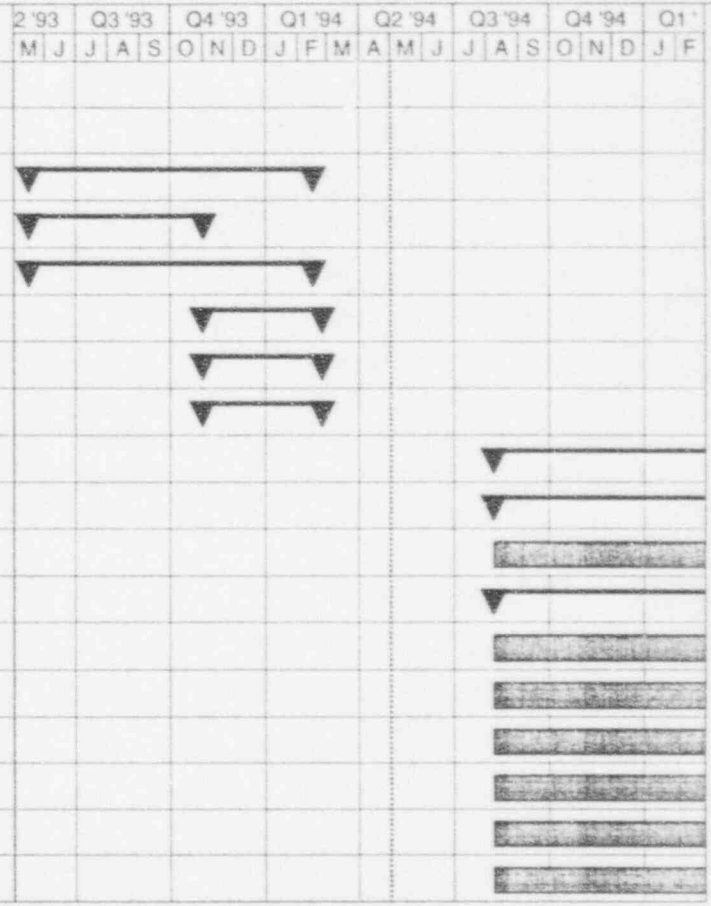
SCHEDULE SUMMARY

The costs and progress estimates on this activity are within the scope set by JP 92-20B.

SCP PROGRAM NAME	SCP STUDY NAME	SCP STUDY PLAN NUMBER	TEST NAME (SCP ACTIVITY)	TPP #	JP #
Geohydrology Program	Characterization of Yucca Mountain Unsaturated-Zone in the ESF	8.3.1.2.2.4	Perched Water Testing in the ESF	TPP 92-11	JP 92-20B

Perched Water (TPP 92-11/JP 92-20B)
Field Activity Working Schedule
LANL ESF Test Coordination Office

ID	Name	Dur	Start	Summary Acct.
1	PERCHED WATER	1893d	5/16/93	
2				
3	STARTER TUNNEL	197d	5/16/93	
4	Test Implementation - Discrete	121d	5/16/93	
6	Test Implementation - Matrix Support	197d	5/16/93	
13	STARTER TUNNEL ALCOVE	84d	11/1/93	
14	Test Implementation - Discrete	84d	11/1/93	
16	Test Implementation - Matrix Support	84d	11/1/93	
23	RAMPS & MAIN	1573d	8/8/94	
24	Test Implementation - Discrete	1573d	8/8/94	
25	USGS Test Implementation	1573d	8/8/94	OG33124G94
26	Test Implementation - Matrix Support	1573d	8/8/94	
27	Los Alamos TCO Coordination & Planning (Field Test Coordination Support)	1573d	8/8/94	OA397BL4
28	Los Alamos TCO Test Management (Project Engineer Support)	1573d	8/8/94	OA616AL4
29	T&MSS Direct Support Services (Photo Support)	1573d	8/8/94	OT3522EL
30	REECo Construction & Operations Support (Contingency) - (*1)	1573d	8/8/94	OR682L4
31	RSN ESF Test Support	1573d	8/8/94	RS3522N4
32	CRWMS M&O Project Control Support	1573d	8/8/94	TR921CA1



Project: Perched Water (TPP 92-11/JP 92-20B)
Date: 4/30/94
Revision #1

Critical
Noncritical
Progress
Milestone
Summary
Rolled Up

Checked by:
Approved by:

T9211TI.MPP

ADMINISTRATIVE USE ONLY

CONSOLIDATED SAMPLING IN THE ESF

PROGRESS - MILESTONES AND DELIVERABLES

The consolidated sampling data collection and observation activity began when the starter tunnel construction exposed suitable rock. The TPP and JP for consolidated sampling were revised during October.

SUMMARY OF FIELD ACTIVITIES

No consolidated sampling took place this month. Work continues on assembling Field Document and Records Center files for activities conducted in the ESF. This effort includes the maintenance of an administrative data base that identifies sample locations and their corresponding photo identifiers.

DATA FLOW INFORMATION

Consolidated sampling data and sample collection activities are controlled by the JP Document and Records Center files, scientific notebooks, AP-6.26Q, sample collection report records and bar codes. Test-related photo and survey mission data is being submitted to the JP record file and the Principal Investigators (PIs).

SCHEDULE SUMMARY

The costs and progress estimates on this activity are within the scope set by JP 92-20C.

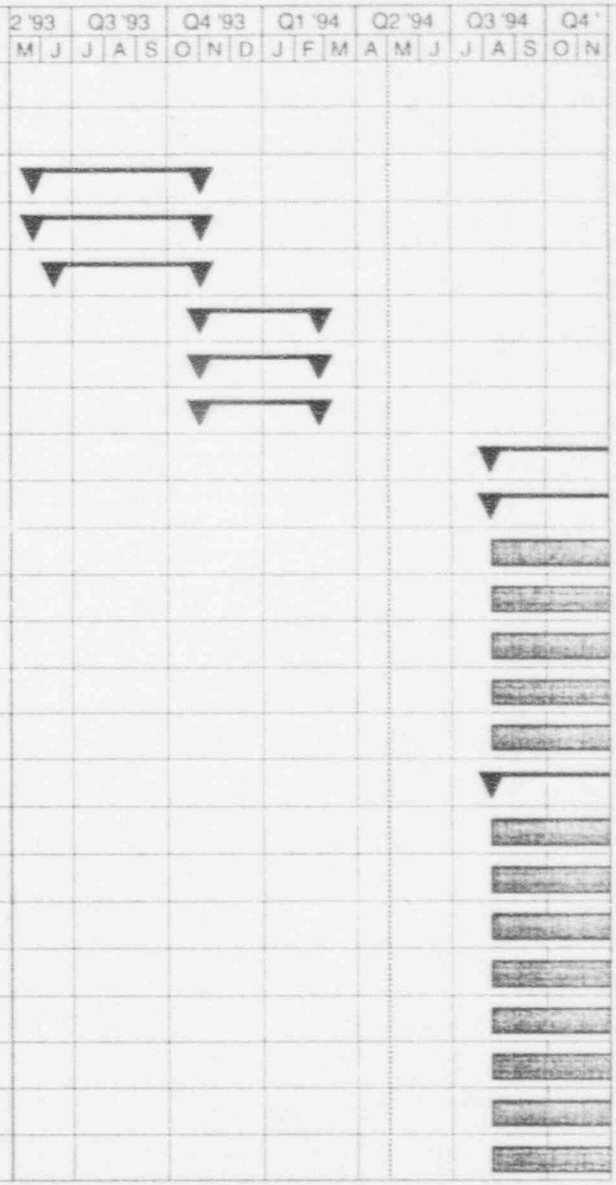
SCP PROGRAM NAME	SCP STUDY NAME	SCP STUDY PLAN NUMBER	TEST NAME (SCP ACTIVITY)	TPP #	JP #
Geochemistry Program	Water Movement Tests	8.3.1.2.2.2	Consolidated Sampling in the ESF	TPP 92-14	JP 92-20C
	Characterization of the Yucca Mountain Unsaturated-Zone Percolation	8.3.1.2.2.3			
	Study Plan for History of Mineralogic Alteration of Yucca Mountain	8.3.1.3.2.2			

Consolidated Sampling (TPP 92-14/JP 92-20C)

Field Activity Working Schedule

LANL ESF Test Coordination Office

ID	Name	Dur	Start	Summary Acct.
1	CONSOLIDATED SAMPLING	1888d	5/24/93	
2				
3	STARTER TUNNEL	116d	5/24/93	
4	Test Implementation - Discrete	116d	5/24/93	
13	Test Implementation - Matrix Support	101d	6/13/93	
22	STARTER TUNNEL ALCOVE	84d	11/1/93	
23	Test Implementation - Discrete	84d	11/1/93	
28	Test Implementation - Matrix Support	84d	11/1/93	
37	RAMPS & MAIN	1573d	8/8/94	
38	Test Implementation - Discrete	1573d	8/8/94	
39	USGS/USBR Structural Features	1573d	8/8/94	OG32212D94
40	History of Mineralogic & Geochemical Alteration at YM	1573d	8/8/94	OA32112CB4
41	RSN Field Survey & Processing	1573d	8/8/94	RS3522N4
42	REECo Test Construction & Procurement	1573d	8/8/94	OR644L4
43	T&MSS Photography & Process	1573d	8/8/94	OT761EL
44	Test Implementation - Matrix Support	1573d	8/8/94	
45	Los Alamos TCO Coordination & Planning (Field Test Coordination Support)	1573d	8/8/94	OA397BL4
46	Los Alamos TCO Test Management (Project Engineer Support)	1573d	8/8/94	OA616AL4
47	T&MSS Direct Support Services EDD	1573d	8/8/94	OT3522EL
48	T&MSS Sample Management Facility	1573d	8/8/94	OT351EL
49	REECo Construction & Operations Support (Interim WBS)	1573d	8/8/94	OR662L3
50	Engineering Survey Support / Survey Processing (Interim WBS)	1573d	8/8/94	RS3522N4
51	CRWMS M&O Networking & Baseline Planning Support (Monthly Cost & Progress Rpt	1573d	8/8/94	TR921CA1
52	JC Photography & Process (Interim WBS)	1573d	8/8/94	OP3522L94



Project: Consolidated Sampling (TPP 92-14/JP 92-20C)
Date: 4/30/94
Revision #1

Critical — Noncritical — Progress — Milestone — Summary — Rolled Up

Checked by: NL

Approved by:

T9214TI.MPP

ADMINISTRATIVE USE ONLY

CONSTRUCTION MONITORING IN THE ESF

PROGRESS - MILESTONES AND DELIVERABLES

The construction monitoring data collection and observation activity began with starter tunnel construction.

SUMMARY OF FIELD ACTIVITIES

The SNL Field Team monitored the Multipoint Borehole Extensometer gauges and convergence pins located in Test Alcove #1 and the main ESF. Readings for rockbolt load cells located in the ESF were also recorded.

DATA FLOW INFORMATION

Construction monitoring data was recorded in a scientific notebook. Test-related photo and survey mission data is being submitted to the JP record file and the PIs.

SCHEDULE SUMMARY

The costs and progress estimates on this activity are within the scope set by JP 92-20D. Illustrations are provided to show progress and test status.

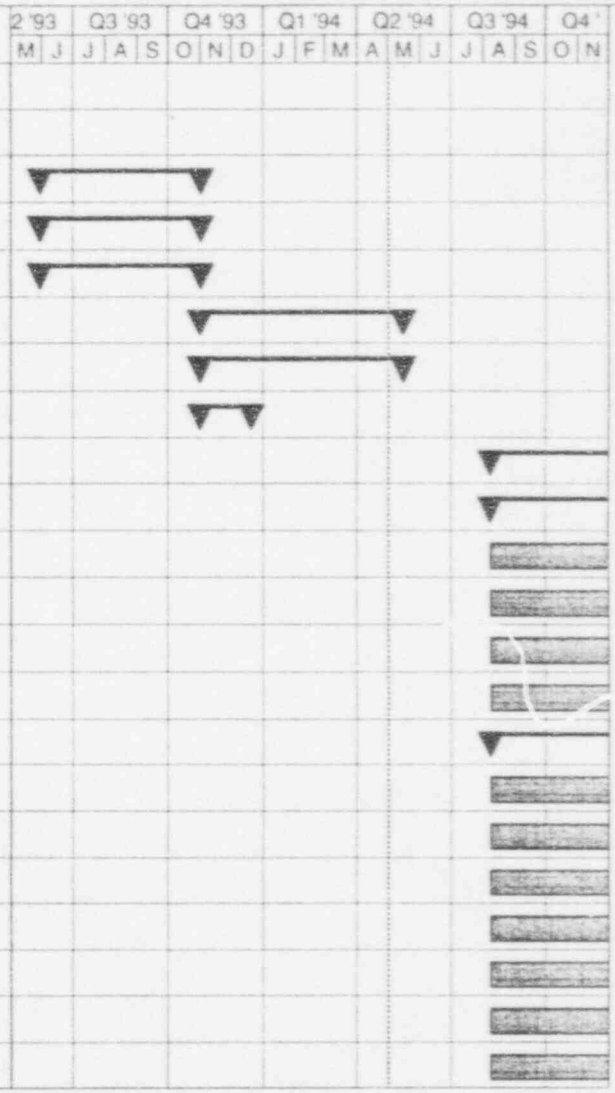
SCP PROGRAM NAME	SCP STUDY NAME	SCP STUDY PLAN NUMBER	TEST NAME (SCP ACTIVITY)	TPP #	JP #
Thermal and Mechanical Rock Properties Program	In Situ Design Verification	8.3.1.1.5.1.8	Construction Monitoring in the ESF	TPP T-93-2	JP 92-20D

Construction Monitoring (TPP 93-2/JP 92-20D)

Field Activity Working Schedule

LANL ESF Test Coordination Office

ID	Name	Dur	Start	Summary Acct.
1	CONSTRUCTION MONITORING	1883d	5/31/93	
2				
3	**STARTER TUNNEL**	**111d**	**5/30/93**	
4	**Test Implementation - Discrete**	**111d**	**5/30/93**	
8	**Test Implementation - Matrix Support**	**111d**	**5/30/93**	
16	**STARTER TUNNEL ALCOVE**	**140d**	**11/1/93**	
17	**Test Implementation - Discrete**	**140d**	**11/1/93**	
22	**Test Implementation - Matrix Support**	**36d**	**11/1/93**	
30	**RAMPS & MAIN**	**1573d**	**8/8/94**	
31	**Test Implementation - Discrete**	**1573d**	**8/8/94**	
32	SNL Test Implementation	1573d	8/8/94	OS42114L93
33	RSN Field Survey & Processing	1573d	8/8/94	RS3522N4
34	REECo Test Construction & Procurement	1573d	8/8/94	OR42114L3
35	Monitoring & Data Collection	1573d	8/8/94	OS42114L93
36	**Test Implementation - Matrix Support**	**1573d**	**8/8/94**	
37	Los Alamos TCO Coordination & Planning (Field Test Coordination Support)	1573d	8/8/94	OA310BL3
38	Los Alamos TCO Test Management (Project Engineer Support)	1573d	8/8/94	OA616AL3
39	T&MSS Direct Support Services (Photo Support)	1573d	8/8/94	OT3522DL
40	REECo Construction & Operations Support (Contingency) - (*1)	1573d	8/8/94	OR682L3
41	RSN Survey Support / Survey Procurement (Contingency)	1573d	8/8/94	RS614P92
42	Engineering Verification	1573d	8/8/94	RS614P92
43	CRWMS M&O Networking & Baseline Planning Support (Monthly Cost & Progress Rpt)	1573d	8/8/94	TR922BA



*1

Project: Construction Monitoring (TPP 93-2/JP 92-20D)
Date: 4/30/94
Revision #1

Critical — Noncritical — Progress — Milestone — Summary — Rolled Up

Checked by: nl

Approved by:

T932TI.MPP

ADMINISTRATIVE USE ONLY

ENGINEERED BARRIER-FRAN RIDGE LARGE BLOCK EXPERIMENT

PROGRESS - MILESTONES AND DELIVERABLES

The Engineered Barrier - Large Block Experiment Site Preparation activity began with site cleaning and selection activities. The Level III milestone MOL67 "Complete Saw Cuts" (Isolation Saw Cuts) was completed on February 25, 1994.

SUMMARY OF FIELD ACTIVITIES

REECo completed drilling 30 holes, 2 meters (6 ft) deep for the rockbolt pull-tests; ten of the holes were grouted with HLN(cc) grout, ten holes with Wil-X grout and the final ten holes were grouted with Sika grout. Pull-testing of the rockbolts commenced and the early results showed that the HLN(cc) grout had a strength well below the other two. The pull-testing of the HLN(cc) rockbolts was discontinued; the pull-testing of the other bolts will be completed early next month. REECo also grouted selected holes in the large block to fill fractures discovered during the logging of the holes. The grouting and redrilling of the holes has been completed.

REECo lengthened four holes on the perimeter of the block by 1.5 meters (5 ft) to allow the installation of anchors to put the block in compression subsequent to commencing excavation. REECo completed drilling the presplit (horseshoe) holes around the large block, approximately 120 holes were drilled. These holes will help facilitate future sample collection.

Raytheon Services Nevada (RSN) surveyed all the instrument holes on the large block, as well as the four holes drilled at the dye test area.

REECo completed installing wood forms around the top of the large block and 3000 pounds per square inch (PSI) concrete was poured on top of the block. The concrete was to level the block in preparation for putting the block under compression prior to excavating the rock around the block. The installation of the grouted rockbolts and the construction of the frame has been completed.

A 65 kilowatt generator was placed next to the existing REECo generator and the Lawrence Livermore National Laboratory (LLNL) trailer was modified to accept the 208 volts output of the new generator.

DATA FLOW INFORMATION

Permeability measurements in the vertical boreholes was completed and the results entered into the scientific notebook.

SCHEDULE SUMMARY

See attached illustrations for detailed schedule information.

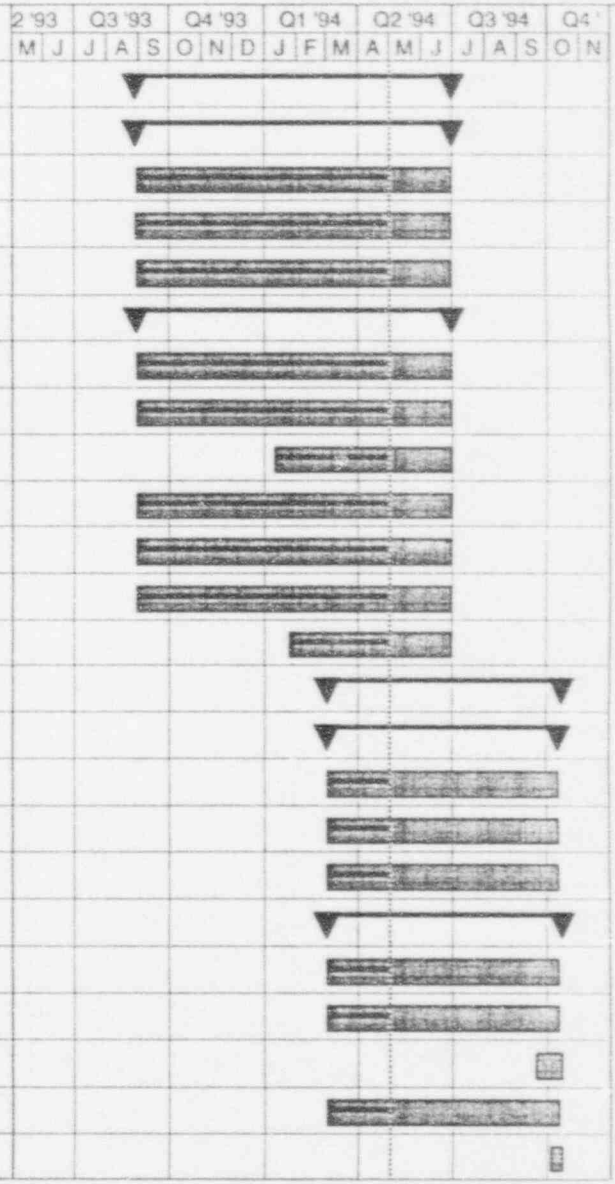
SCP PROGRAM NAME	SCP STUDY NAME	SCP STUDY PLAN NUMBER	TEST NAME (SCP ACTIVITY)	TPP #	JP #
Repository Horizon Rock-Water Interaction Large Block Experiment	Large Block Experiment	8.3.4.2.4.4	Engineered Barrier-Fran Ridge Large Block Experiment	NA	JP 93-10

Engineered Barrier - Large Block Experiment (JP 93-10)

Field Activity Working Schedule

Los Alamos National Lab

ID	Name	Dur	Start	Summary Acct.
1	**PHASE I - SITE PREPARATION - EB LRG. BLOCK TEST (JP 93-10)**	**219d**	**8/29/93**	
2	**Site Preparation - Discrete**	**219d**	**8/29/93**	
3	LLNL Site Preparation Monitoring	219d	8/30/93	OL224HZA
4	RSN Field Survey & Processing	219d	8/29/93	RS224A94
5	REECo Test Construction & Procurement	219d	8/30/93	OR224(TBD)
6	**Construction Implementation - Matrix Support Elements**	**219d**	**8/30/93**	
7	Los Alamos TCO Coord. & Planning (Field Test Coord)	219d	8/30/93	OA397CL4
8	Los Alamos TCO Test Mgt. (Project Engineer Support)	219d	8/30/93	OA616AL4
9	T&MSS Sample Management Facility	124d	1/10/94	OT351EL
10	REECo Construction & Operations Support - Interim WBS	219d	8/30/93	OR682LH
11	Engineering &Survey Support/Survey Processing - Interim WBS	219d	8/30/93	TR614CAF1
12	CRWMS M&O Network & Baseline Plan Support (Mo Cost/ Progress Rpt)	219d	8/30/93	TR921BA1
13	JC Photo & Processing	114d	1/24/94	OP3522L94
14	**PHASE II - TEST CONSTRUCTION - EB LRG. BLOCK TEST (JP 93-10A)**	**164d**	**3/1/94**	
15	**Test Construction - Discrete**	**162d**	**3/1/94**	
16	LLNL Test Construction	162d	3/1/94	OL224HZA
17	RSN Field Engineering & Survey	162d	3/1/94	RS224A94
18	REECo Test Construction & Procurement	162d	3/1/94	OR224(TBD)
19	**Test Construction - Matrix Support Elements**	**164d**	**3/1/94**	
20	Los Alamos TCO Coord. & Planning (Field Test Coord)	162d	3/1/94	OA397CL4
21	Los Alamos TCO Test Mgt. (Project Engineer Support)	162d	3/1/94	OA616AL4
22	T&MSS Sample Management Facility	20d	9/19/94	OT351EL
23	CRWMS M&O Network & Baseline Plan Support (Mo Cost/ Progress Rpt)	162d	3/1/94	TR921BA1
24	JC Photo & Processing	10d	10/3/94	OP3522L94



Project: JP 93-10
Date: 4/30/94
Revision #1

Critical — Progress — Summary — Checked by: ML

Noncritical — Milestone — Rolled Up — Approved by:

T93LBT94.MPP

ADMINISTRATIVE USE ONLY

HYDROCHEMISTRY TESTS IN THE ESF

PROGRESS - MILESTONES AND DELIVERABLES

The Hydrochemistry Tests in Alcove #1 began in September and will run though October of 1994. The TCO will submit weekly activity reports to the Field Test Coordinator (FTC) and monthly data collection status reports.

SUMMARY OF FIELD ACTIVITIES

The USGS completed a log of the upper and lower holes using a television camera/video recorder. The first run to clean out the lower right hole was accomplished. As the drill string was being removed from the hole, it was noted that the pipe was "wet" in various locations from approximately 6 meters (20 ft) to 20 meters (65 ft). The following day, the USGS completed running a television camera to approximately 29 meters (90 ft) in the lower right hole where some rubble was encountered, but no indication of moisture. The camera was pulled out of the hole and the hole was cleaned. The cuttings removed from the cleaning did not indicate any moisture, and the drill string did not show any moisture. It was then determined the drill string was cold, the air humidity was high, and the hole was warm from being closed in, resulting in condensation on the drill string.

DATA FLOW INFORMATION

All field issues affecting data collection shall be brought to the attention of the LANL Field Test Representative (LANL FTR). The Sample Management Facility (SMF) will submit all records called for in AP-6.26Q or associated procedures, such as sample collection forms and records documenting visual core recording techniques (video, etc.) to the LANL FTR. The TCO will submit a close out report under this JP.

COST AND SCHEDULE SUMMARY

The costs and progress estimates on this activity are within the scope set by JP 92-20E. Illustrations are provided to show progress and test status.

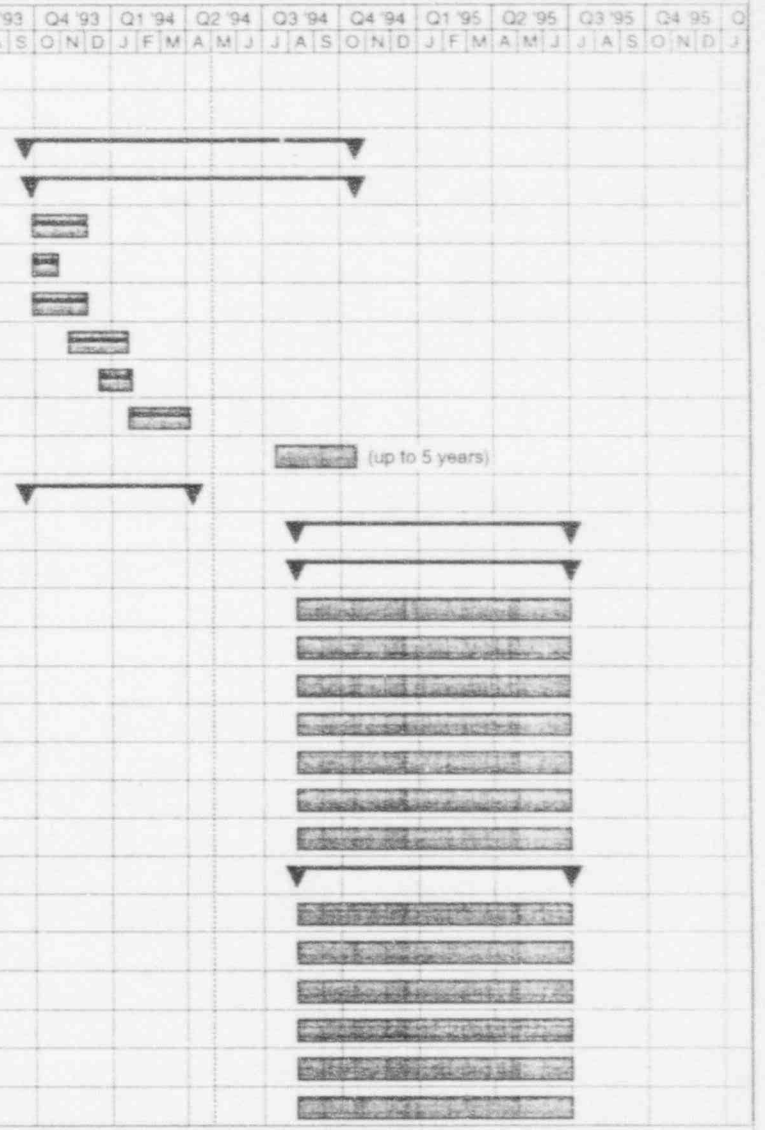
SCP PROGRAM NAME	SCP STUDY NAME	SCP STUDY PLAN NUMBER	TEST NAME (SCP ACTIVITY)	TPP #	JP #
Geohydrology Program	Characterization of the Yucca Mountain Unsaturated-Zone in the ESF	8.3.1.2.2.4	Hydro-chemistry Tests in the ESF	TPP 92-12	JP 92-20E

Hydrochemistry (TPP 92-12/JP 92-20E)

Field Activity Working Schedule

LANL ESF Test Coordination Office

ID	Name	Dur	Start	Summary Acct.
1	HYDROCHEMISTRY	1803d	9/20/93	
2				
3	**STARTER TUNNEL ALCOVE**	**283d**	**9/20/93**	
4	**Test Implementation - Discrete**	**278d**	**9/27/93**	
5	USGS Short Borehole Test	50d	9/27/93	OG33124H94
6	RSN Field Survey	25d	9/27/93	RS614P94
7	REECo Test Construction & Procurement	50d	9/27/93	OR33124H94
8	REECo Drilling	54d	11/9/93	OR33124A
9	T&MSS/SMF Core Handling	30d	12/15/93	OT351EL
10	Long Boreholes - Test & Monitoring	54d	1/20/94	OG33124H94
11	Radial Borehole Test - Test & Monitoring	70d	7/14/94	OG33124D94
12	**Test Implementation - Matrix Support**	**145d**	**9/20/93**	
19	**NORTH RAMP ALCOVES**	**235d**	**8/8/94**	
20	**Test Implementation - Discrete**	**235d**	**8/8/94**	
21	USGS Test Implementation	235d	8/8/94	OG33124H94
22	RSN Field Survey	235d	8/8/94	RS614P94
23	REECo Test Construction & Procurement	235d	8/8/94	OR33124H94
24	REECo Drilling	235d	8/8/94	OR33124A
25	T&MSS/SMF Core Handling	235d	8/8/94	OT351EL
26	Long Boreholes - Test & Monitoring	235d	8/8/94	OG33124H94
27	Radial Borehole Test - Test & Monitoring	235d	8/8/94	OG33124D94
28	**Test Implementation - Matrix Support**	**235d**	**8/8/94**	
29	Los Alamos TCO Coordination & Planning (Field Test Support)	235d	8/8/94	OA310CL3
30	Los Alamos TCO Test Management (Project Engineer Support)	235d	8/8/94	OA616AL3
31	REECo Construction & Operations Support	235d	8/8/94	OR682L3
32	RSN Survey Support / Capital Procurement	235d	8/8/94	RS3552N4
33	CRWMS M&O Networking & Baseline Planning Support (Network & Progress Rprts)	235d	8/8/94	TR313CB
34	JC Photo & Processing (General)	235d	8/8/94	OP3522L94



Project: Hydrochemistry (TPP 92-12/JP 92-20E)
Date: 4/30/94
Revision #1

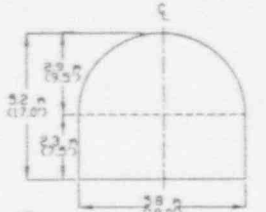
Critical | Noncritical | Progress | Milestone | Summary | Rolled Up

Checked by: _____

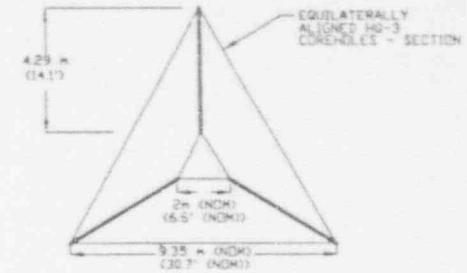
Approved by: _____

T9212TI.MPP

ADMINISTRATIVE USE ONLY



A ALCOVE SECTION PROFILE



B FRONT VIEW OF BOREHOLE ARRANGEMENT
BOREHOLE ARRANGEMENT SECTION PROFILE

C BOREHOLE ARRANGEMENT/DIMENSIONS
BOREHOLE ARRANGEMENT SECTION PROFILE

GRAPHIC SCALE

3.1 (10) 0 3.1 (10) 6.2 m (20 FT.)

COMMENTS:

DATA FROM M&O DESIGN DRAWING #SS-M-SK049 TITLED "TEST ALCOVE NO. 1 PROPOSED LAYOUT PLAN AND SECTION"

DATA BASED ON LETTER, EDWARDS TO ELKINS, "LOCATION AND ORIENTATION OF THE RADIAL BOREHOLE IN ESF ALCOVE 31 (STUDY PLAN 8.3.1.2.2.4)," DATED JANUARY 31, 1994, DLE/dz.

LEGEND:

CENTER LINE OF RAMP
PROPOSED BOREHOLES
EXCAVATED RAMP

LOS ALAMOS NATIONAL LABORATORY
TEST COORDINATION OFFICE - YUCCA MOUNTAIN PROJECT

PROJECT: TEST ALCOVE #1
FINAL LAYOUT PLAN AND
SECTION BASED ON TRIM ROUND

CAD FILE: ALCO3F3.DWG	AUTOCAD R12	SIZE: A	SCALE: NOTED	REVISION: A1
DRN. BY: D.J. WEAVER	APPROVED BY: ON FILE N.Z. ELKINS/R.D. OLIVER		DATE DRN: 2/3/94	
NOTES: ADMINISTRATIVE/ILLUSTRATIVE USE ONLY			PLOT DATE: 4/26/94	

Enclosure 1