PROCEDURE NUMBER	APPROVED	DATE
*12.10.4		06/21/83
VOLUME NAME		
12 CHEMISTRY PROCEDURES		
SECTION		
12.10 POST ACCIDENT SAMPLING AND ANALYSIS		
TITLE		
*12.10.4 DETERMINATION OF BORON		

12.10.4.1 Purpose

This procedure determines boron concentration in reactor coolant from a 1 to 10 diluted large volume degased sample.

12.10.4.2 Precautions/Prerequisites

A. All analysis for boron are to be performed when conditions are ALARA.

B. Direct all waste lines from the ion chromatograph to a waste container that is shielded and inside a hood.

C. Ion chromatograph system 2 valves must be toggled to:

Separator 1

Suppressor 1

Eluent 1

D. System 2 flow rate must be 1 ml/min.

E. HP3390 integrator settings:

1. Run Parameters

Zero = 0

ATT 2 = 8

Cht. SP = 0.5

Pk. WD = 0.40

UNCONTROLLED

Thrsh = 7

Ar Rej = 0

2. Report Options

RF UNC PKS = 0.0E+0

Mul Factor = Scale Setting

Pk Height Mode Yes

Extend RT No

RPRT UNC PKS Yes

3. Time Tbl

12.00 STOP

F. Dose rate meters must be present and calibrated. Survey all equipment and general area for dose rates continuously during analysis and sample handling.

12.10.4.3 Reagents (prepare when existing stock is depleted)

A. Eluent 1

Demineralized water.

B. 1000 ppm Boron Stock Standard

Dissolve 6.18 gm of boric acid, previously dried for one hour at approximately 105°C, in demineralized water then dilute to 1 liter. Make working standards by making volometric dilutions from the stock standard. Label as per PPM 12.2.6.4.

12.10.4.4 Equipment

A. ICE Separator No. 3089D

B. 3cc or larger disposable syringes

C. Evacuated 14cc vial

12.10.4.5 Procedure

A. Fill a syringe with air and attach to the system 2 injection port.

B. Place the load/inject switch to load.

C. Inject air into the sample loop to remove any liquid from the sample line.

D. Place sample needle into a boron standard.

NOTE: If sodium penetaborate has been injected into the reactor system a boron standard of 100 ppm boron would be appropriate.

E. Using the syringe draw the standard into the sample loop until liquid is seen entering the syringe.

F. Enter the scale setting into the integrators multiplication factor: Press OP then 6, enter conductivity meter scale setting times 10, then press enter.

G. Simultaneously place the load/inject switch to inject and press the integrator start button. Place the load inject switch to load after approximately 10 seconds.

H. After the chromatogram has run calibrate the integrator using the following steps:

Del Calib

CALIB ESTD

Ref RTW = 5

RTW = 5

Cal #1 RT = (Enter boron retension time in minutes)

AMT = (Enter boron standard amount in ppm)

ENTER

I. With the load/inject switch in load flush the sample line with demineralized water.

J. Flush the sample loop with air.

K. Enter the scale setting times 10 into the integrator multiplication factor. Press OP then 6, enter the conductivity meter scale setting times 10, then press enter.

L. Draw sample into the sample loop until liquid is detected entering into the syringe.

M. Simultaneously switch load/inject switch to inject and press integrator start. Switch load/inject switch to load after 10 seconds. The integrator will report ppm boron in reactor coolant.

N. Remove the syringe and dispose of as high level radioactive waste.

O. Carefully remove the sample needle and insert into 14cc evacuated vial. Dispose of as high level radioactive waste after excess liquid has been drawn from the sample system.