

PRNC052

PRNC 52

PUERTO RICO NUCLEAR CENTER

PROCEDURES FOR OPERATING Co⁶⁰ GAMMA

IRRADIATION FACILITY

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hte Procedure gor operating co? Gamma Irradiation

Facility has been reviewed and approved by the Sarsty Come

nittee.

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4s berety approved and made operative aa of April

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Procedures fox Operating Co Gonna

Irradiation Pactlity

DESCRIPITON OF SOURCE

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Poets

The cobalt-S0 Gara Irradiation Factiity (GIF) for

FANG 1ϕ housed in room 121 in the PRIC building at Maya
sues. This room has @ double door to the ear corridor
?and to separate single doors to laboratory room 103.
?The room will have a cabinet for storing grappling hooks
etc., tables for working space, tanks of Op, Ng and com
pressed air, and a water circulating system for the pool.

Food

A pool 9" x 18" x 6" deep that is located in room
221 contains the cooling water as a shield. A dry
well is adjacent to one end of the pool with an aluminum
plate separating the two sides. The dry well will not
be used and the port will be shielded as necessary to
reduce scattered radiation through the dry well.

A portable

deck bridge which goes across the top
of the pool will serve as the base for the operator con
ducting treatments.

A platform 4' x 8' is located 10 feet below the

Water in the pool. This platform has twelve cylinders

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to hold the capsules. It will rotate the hollow cylinder
variable geometry irradiator.

A radiation monitor with audio alarm is preset
at 20 mR per hour. The probe will be attached to the
underside of the triage above the platform area where
the irradiations will be conducted.

HOLLOW CYLINDER VARIABLE GEOMETRY IRRADIATOR

The C060 is contained in twelve pencil type capsules

each containing approximately 200 curies. The capsules
are inserted in the Hollow Cylinder Variable Geometry
Irradiator (VOI). The VOI is adjustable to form a hollow

cylinder from 1 inch to 18 inches in diameter. A.

1d can be obtained by using 12, 6, or 3

symmetrical ti:

capenies.

SAMPLE HOLDERS

Samples to be Arradfated will be placed in wi

nouth polyethylene hotties of appropriate size from one
to eighteen inches tn diancter, Tue cap of the kottle
thas a comsetion for attaching a rod. A connection for
fastening an air hove aut a twee for release of

excess air fron positive pressure 12 pact of sone ot

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TE, AUTHORIZED PERSONNEL AND RESPONSIBILITIES

(A) SUPERVISOR RESPONSIBILITIES:

In charge of facility.

2. Responsible for training of assistant supervisors.

3. Responsible for keys for OTF.

4. Responsible for changing geometry of variable geometry reactor.

Responsible that procedures are fully complied

with.

6. Responsible for scheduling use of GIP.

7. Responsible for recommending to Health Physics personnel to be assistant supervisors.

(B) ASSISTANT SUPERVISOR RESPONSIBILITIES:

1. Responsible for items 3, 4, 5, 6 under supervisor.

(C) PERSONNEL USING FACILITY RESPONSIBILITIES:

Responsible for filing form 663 with Health Prystes.

2, Responsible for making appointment to use facility.

Responsible for placing and removing materials

to be irradiated,

A, Responsible for insuring that materials placed

in pool do not contain the facility.

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TTT, WOADLG AND UMUOADDIE SOURCE PROCEDURE

(4) storage containers

?The capsules will be stored in individual cylinders

in the platform in the pool or in the variable geometry

Arriator, The grapplers etc. will be Locked in their cabinet.

() PROCEDURE FOR LOADING, UNLOCKING AND CHANGING GZOMERY

?There will always be two persons involved in loading

of unloading the VOI, at least one

being the supervisor

of an assistant supervisor, ?The step by step procedure

is as follows:

+ Put signs on doors of ~21 and lock the room.

2, Unlock cabinet containing grapplers, portable monitor, etc

3. Check monitor and radiation detection alarms
check portable survey meter.

4, Turn off all Lights and count capsules in twelve

holders as well as check VOI in pool. Check.

is by Cerenkov effect with Lights off.

+ Turn Lights on,

6. One person with portable survey meter 42 on side
of pool to check for radiation during rest of

procedure,

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7. Using yeast remove

from VGT and place in capsule holders.

8, Turn off all Lights and count capsules

holders as well as check VUE in pool.

te ty Corsakow ert

with Lights off.

WILL Ue double checked with ights off and on

to nako sure so capsule tas been left in by

nntotak

9. Tum Ughte on.

10, Remove VOI from pool ant place en table.

LL, Set VOT to desired position.

22, Return Val to pool and platfora.

23, Using grappler, place co6? capssles one By oc#

vor.

s. Return grupplore, ete, te cabinet and Lock.

15. Check coupneased air (or Nay Oo) supply and

connections.

Ready for irradiation.

Scientific staff may use room 12L as a laboratory during irradiations but will not be present when

Loading or unloading of

samples to the VOI 1s being

conducted. Because of the storage of OgeyLingers in the room it is STRICTLY forbidden to smoke or

use open flame.

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TV, SAMPLE IRRADIATION PROC

?The responsibility for an Irradiation procedure will fall on

?the person conducting the experiment after he has become familiar

with the facility. Until then, the supervisor will be responsible,

Samples to be irradiated will be placed in polyethylene containers

and kept dry. They may be irradiated in air, oxygen or

nitrogen atmospheres. The procedure is as follows:

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2h

Place sample in polyethylene container.

Secure cap on container.

Connect appropriate air pressure hose to cap.

Connect ren rod to cep.

Lower container th pool Just below surface and test
for aiz pressure by observing bubbles frox outlet.

Set tine for deeired tnterval (determined from charts),

Place contetner tm VOT and atart tiner.

Woen time interval has elapsed, venove container from
pool and place on table,

Shut off atr pressure.

Remove van rod,

Renove air hose.

Fenove cap.

?ake out eanple,

Record tn log book.

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IV. SAFETY PROVISIONS IN CASE OF UTILITIES FAILURE OR MALFUNCTION

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(3)

WATER Loss

The pool is provided with a water level alarm set to sound when the level drops 8" below normal (1M'),

There are three ways in which water may be lost from the pool: (1) evaporation (2) pumping (3) earthquake cracking walls. Evaporation loss will be compensated by the water line with a float valve that opens when the water level drops one inch.

The pump will be modified so that all outlets from the pool go into the pool. This will not affect its standard

operation as the purpose is to circulate and filter the

water. If an earthquake occurs of sufficient magnitude to crack the reinforced concrete walls resulting in @
loges of the water the area will be vacated. The radiation alarm should sound (if there were still electricity) but no detailed corrective procedures are offered at this time. The circumstances would be such that they could best be worked out after such an eventuality.

Power PAUIER

?The operation of the GIF is entirely manual operation,

?he alarm systems are electrical and Lights to

observe the operations also are electrical, but otherwise

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tc)

?the facility is independent of electrical power. & battery operated portable Light is available, In the event of electrical failure, all experiments will be stopped and the GIF put in stand-by condition (as if in storage) following the previously outlined procedure.

CAPSULE INCIDENT

There are various ways in which a capsule incident, is conceivable.

1. Drop

If a capsule is dropped it would always fall to the bottom of the pool or to the platform or other object above the bottom, Whenever a drop occurs, the capsule will not present a radiation hazard, The corrective procedure is to pick it up with the grapple and place it where it belongs.

2, Jaoming in VOT

If this accident occurs @ Hoath Phystetst

WALL be called before proceeding.

The WI Ls made of aluminum and a capsule

could become wedged in it, If this does occur,

#11 other capsules will be removed from the VOI.

The capsules are not forced into place so any

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Jeming should be of a minor degree. The

?onpaula will be pulled up with the VGE held

in place until it becomes loose. A sudden

release of the capsule cannot occasion @

radiation based

mise it could be Listes

over four feet, tofore sadiation can be
detected at the surface.

?apaute raise too Bigh in loading ¥OL

?The grappler used to ?ransfer the capaules

from their storage container to the Val ts

designed vith suc = length teat when the
capsule is six inches above the cep of the
Vor the onpoaite end of the erappier strikes

?the ceiling in room 121. Ine grappler will

alsnys be bold fn a vertical position wen

used to transfer the capsules. ?The raiiation

Monitor audiotote alam sounds wher the Level

reaches 20 mr/nr. A second person will te

ft the pool side to observe errors of judgment.

as to distan

and Wi21 have @ portable curry

eter to inticate rediation levels.

Lifting Vor vith capsui

still in irradiator,

Before raising the Yul, the capsules wilt

always be counted in the twelve capsule holders

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WIL be checked for

on the platforms. The VG
any capsules with light on and off (for Cerenkov
effect). when the VOI is raised from the pool,
it will be done slowly and the operation will be
monitored in the manner

to avoid accidental
capsule raising.

Some bottles cannot be removed from the VOI.

?The platform has two brackets fastened to

to avoid cover the logs of the VOI. If the
bottle becomes jammed so that an upward pull
would lift the entire VOI, the brackets will
limit the movement to 3 inches.

?The procedure that will be followed under

these circumstances is to remove the capsules

as outlined in 3}

ion TE. Then the entire VGI

can be removed from the pool and the bottle

separated from the

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