TRAN EMBC PDM TRAN:EX

From:	HLTH MOC Duty Officer HLTH:EX
Sent:	Tuesday, May 9, 2017 10:44
To:	JOC - Joint Operation Centre (esqjocswo@forces.gc.ca); Duffy, Chris D TRAN:EX; Mohrmann, Ralph TRAN:EX; TRAN EMBC PECC Director 1 TRAN:EX; TRAN EMBC PDM TRAN:EX; 'todd.bradford2@forces.gc.ca'; 'james.brooks@bccdc.ca'; 'francois.theriault@canada.ca'; 'boris.krasikov@forces.gc.ca'; 'wojciech.drobina@canada.ca'; 'david.duchesne@canada.ca'; XT:Tyndall, Dr. Mark HLTH:IN; 'sue.olson@canada.ca'; 'melissa.kia@forces.gc.ca'; Smith, Darrell R AGRI:EX; Henry, Bonnie HLTH:EX; Kendall, Perry HLTH:EX; Paton, Arlene HLTH:EX; Stevenson, Lynn HLTH:EX; Plank, Sarah GCPE:EX; Anderson, Kristy GCPE:EX; 'wojciech.drobina@canada.ca'; Pridham, Dave ENV:EX
Cc:	'amanda.wirth-pothier@forces.gc.ca'; Forge, Kathryn HLTH:EX; XT:Lavery, John HLTH:IN; Caitlin.McGuire@phsa.ca; HEMBC Leadership Team (HEMBC_SLT@phsa.ca)
Subject:	Unconfirmed Information - Possible Nuclear emergency in Washington State
Attachments:	BC Nuclear Emergency Plan 2015.pdf
Follow Up Flag:	Follow up
Flag Status:	Flagged

The U.S. Department of Energy (DOE) Richland Operations Office activated the Hanford Emergency Operations Center in Washington State at 8:26 a.m., after an alert was declared at the 200 East Area. This is at the Hanford Nuclear Site. There are concerns about subsidence in the soil covering railroad tunnels near a former chemical processing facility. The tunnels contain contaminated materials.

Actions taken to protect site employees include:

- Facility personnel have been evacuated
- As a precaution, workers in potentially affected areas of the Hanford Site have gone indoors
- 09 May 2017

- **Latest Information**
- Responders are on the scene and are reporting the soil has subsided in an area approximately 20 feet by 20 feet over one of the tunnels next to the Plutonium Uranium Extraction Facility, also known as PUREX. There is no indication of a release of contamination at this point.

More information is available at http://www.hanford.gov/c.cfm/eoc/?page=290

We have been in contact with the WA State Department of Health Duty Officer and they will be provided a situation summary/update as soon as they are able to validate the information. The Provincial Health Duty Officer will continue to monitor with the HECC activated to a level 1.

The BC Nuclear Emergency Plan (attached) has NOT been activated at this time.

Melia Walker
Provincial Health Duty Officer
Ministry of Health
250-686-6061

Hlth.dutyofficer@gov.bc.ca

TRAN EMBC PDM TRAN:EX

From: TRAN EMBC PDM TRAN:EX
Sent: Tuesday, May 9, 2017 11:32
Cc: Forge, Kathryn HLTH:EX
Subject: Hanford Nuclear Site Incident May 9, 2017

INITIAL REPORT:

You may be aware of the incident below from Social media feeds ...

FYI

There has been a report of a Nuclear incident at the Hanford site in Washing State (See map below)

We (BC) are not implementing our Nuclear Plan at this time. (in consultation with HLTH lead)

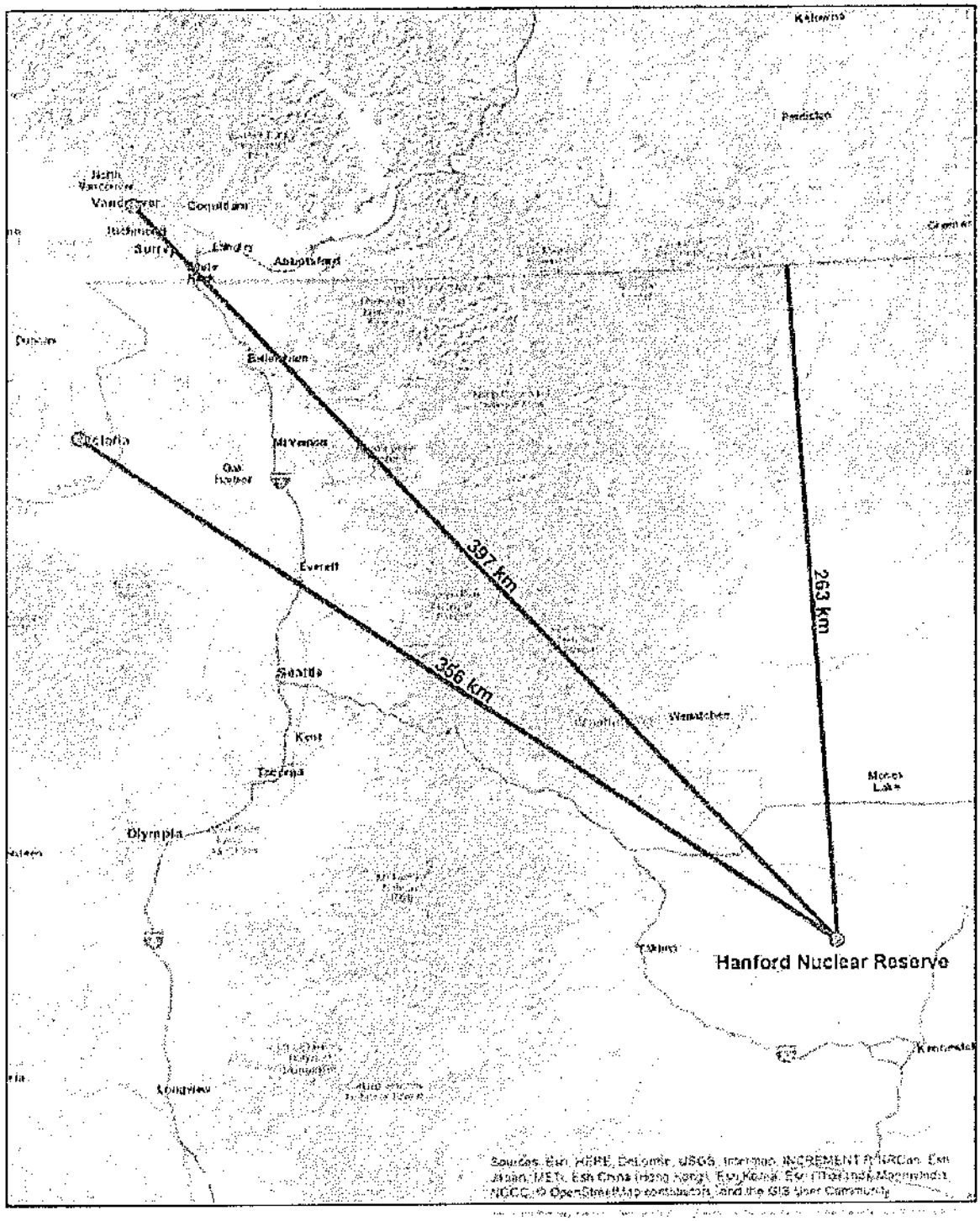
The HLTH EM Duty Officer has been and continues to be in contact with Washington State to get updates on the situation.

Most current information is :

- There has been radioactive material "released in tunnels"
- This is believed to be **contained in the tunnel.**
- They are escalating from an ***Alert*** state to >> **Site Area Emergency**

Best information at this time indicates materials are contained within the tunnel / this is a "shelter in place" scenario - ***at the local level***

Hanford Nuclear Reserve Distances



http://www.hanford.gov/c.cfm/eoc/?page=290

More updates to follow.

Ron Ewanyshyn | Provincial Duty Manager
Emergency Management BC
Block A – Suite 200, 2261 Keating Cross Rd
Saanichton, BC CANADA V8M 2A5

Ph: 250-952-4278 Fax: 250-952-4872
24 Hour Emergency: 1-800-663-3456

Follow us on Twitter @EmergencyInfoBC and @PreparedBC

TRAN EMBC PDM TRAN:EX

From:	TRAN EMBC PDM TRAN:EX
Sent:	Tuesday, May 9, 2017 11:32
To:	Anderson, Gordon A TRAN:EX
Cc:	Lightbody, Ian TRAN:EX; Duffy, Chris D TRAN:EX; Tanaka, Sandra TRAN:EX; Lightbody, Ian TRAN:EX; McClintock, Carol TRAN:EX; Clark, Mary-Ellen TRAN:EX; Cox, Monica TRAN:EX; Mohrmann, Ralph TRAN:EX; Prendergast, Peter L TRAN:EX; Cunnings, Ian TRAN:EX; McCaffrey, Julianne GCPE:EX; Woolford, Sonia M TRAN:EX; Allen, Rod J TRAN:EX; Bates, Stan TRAN:EX; Ewanyshyn, Ron TRAN:EX; Stanford, David TRAN:EX; Sommerville, Derek A TRAN:EX; de Breyne, Nic TRAN:EX; Lyle, Heather TRAN:EX
Subject:	Hanford Nuclear Site Incident May 9, 2017

INITIAL REPORT:

You may be aware of the incident below from Social media feeds ...

FYI

There has been a report of a Nuclear incident at the Hanford site in Washing State (See map below)

We (BC) are not implementing our Nuclear Plan at this time. (in consultation with HLTH lead)

The HLTH EM Duty Officer has been and continues to be in contact with Washington State to get updates on the situation.

Most current information is :

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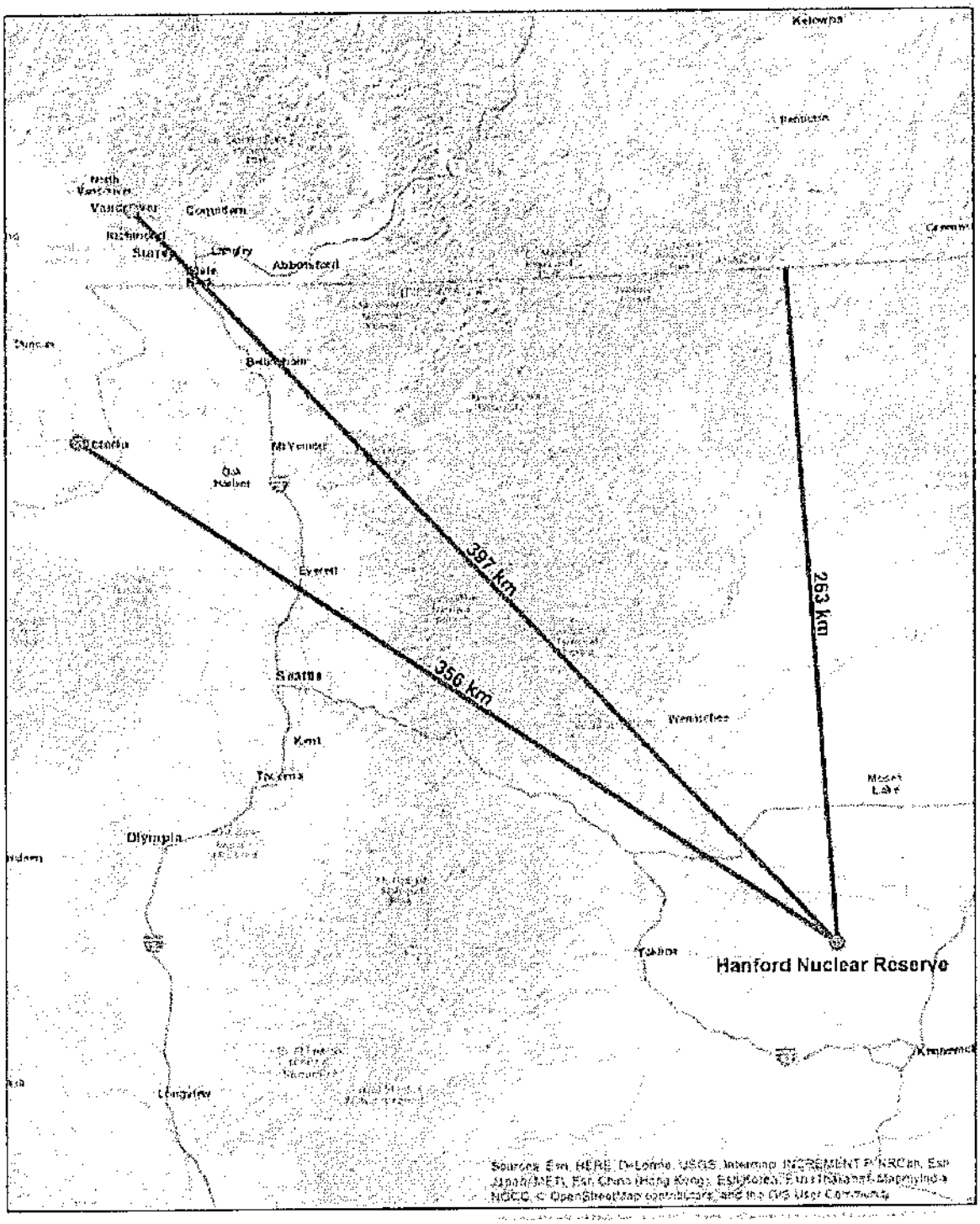
- This is believed to be **contained in the tunnel.**
- They are escalating from an ***Alert*** state to >> **Site Area Emergency**

Best information at this time indicates materials are contained within the tunnel / this is a "shelter in place" scenario - ***at the local level***

Hanford Nuclear Reserve Distances



http://www.hanford.gov/c.cfm/eoc/?page=290

More updates to follow.

Ron Ewanyshyn | Provincial Duty Manager
Emergency Management BC
Block A – Suite 200, 2261 Keating Cross Rd
Saanichton, BC CANADA V8M 2A5

Ph: 250-952-4278 Fax: 250-952-4872
24 Hour Emergency: 1-800-663-3456

Follow us on Twitter @EmergencyInfoBC and @PreparedBC

TRAN EMBC PDM TRAN:EX

From: TRAN EMBC PDM TRAN:EX
Sent: Tuesday, May 9, 2017 11:33
Subject: Hanford Nuclear Site Incident May 9, 2017

INTERNAL EMBC USE ONLY - NOT TO BE FORWARDED

INITIAL REPORT:

You may be aware of the incident below from Social media feeds ...

FYI

There has been a report of a Nuclear incident at the Hanford site in Washing State (See map below)

We (BC) are not implementing our Nuclear Plan at this time. (in consultation with HLTH lead)

The HLTH EM Duty Officer has been and continues to be in contact with Washington State to get updates on the situation.

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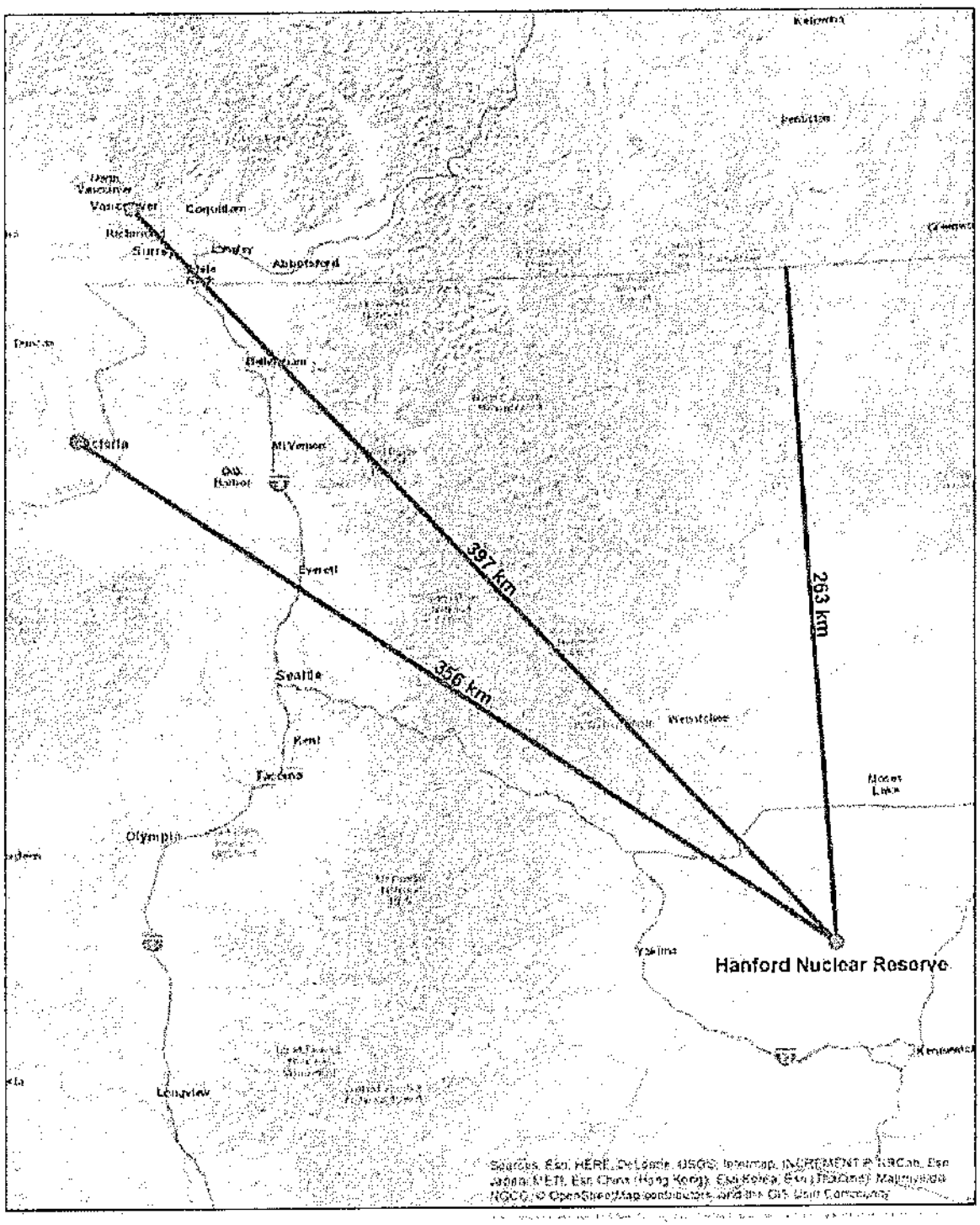
Hanford Nuclear Reserve Distances



http://www.hanford.gov/c.cfm/eoc/?page=290

More updates to follow.

Ron Ewanyshyn | Provincial Duty Manager
Emergency Management BC
Block A – Suite 200, 2261 Keating Cross Rd
Saanichton, BC CANADA V8M 2A5

Ph: 250-952-4278 Fax: 250-952-4872
24 Hour Emergency: 1-800-663-3456

Follow us on Twitter @EmergencyInfoBC and @PreparedBC

TRAN EMBC PDM TRAN:EX

From:	TRAN EMBC ECC1 TRAN:EX
Sent:	Tuesday, May 9, 2017 12:11
To:	Kervel, John ENV:EX; Pridham, Dave ENV:EX; Sego, D'Arcy ENV:EX; Boyle, Laurie F ENV:EX; Brach, Pader W ENV:EX; Knox, Graham G ENV:EX; Poss, Angie ENV:EX; *Public Safety Canada PSC ; AANDC; ABR Critical Incidents and Emergency Management Branch; Anderson, Gordon A TRAN:EX; Brett, Rhonda ENV:EX; Cooper, Robert TRAN:EX; Duffy, Chris D TRAN:EX; Fallows, Norm ENV:EX; French, Ron TRAN:EX; Green, Darrell TRAN:EX; Lipsett, Kandis ENV:EX; Launder, Sue R TRAN:EX; Lightbody, Ian TRAN:EX; Macfarlane, Mike ENV:EX; McCaffrey, Julianne GCPE:EX; HLTH MOC Duty Officer HLTH:EX; Owens, Rick TRAN:EX; Ree, Terrance TRAN:EX; Salem, Rod J EHS:EX; TRAN EMBC OPERATIONS REGIONAL STAFF ALL; TRAN EMBC PDM TRAN:EX; TRAN EMBC Social Media; Turner, Jordan GCPE:EX; Turner, Robert TRAN:EX; Watson, Andy GCPE:EX
Subject:	DGIR 170468 original, update 1 and 2
Attachments:	DGIR 170468.pdf; DGIR 170468 Update 1.pdf; DGIR 170468 Update 2.pdf

Operations Officer - Emergency Coordination Centre
EMERGENCY MANAGEMENT BRITISH COLUMBIA
24 hour Emergency Reporting: 1.800.663.3456 Fax: 250.952.4872
www.embc.gov.bc.ca

Emergency Management BC

Dangerous Goods Incident Report

DGIR 170468 - INLAND

Category : Code 1
Incident Date Time :
MCTS # :

Spiller : HANDFORD NUCLEAR FACILITY

Location : DOE HANDFORD NUCLEAR FACILITY, WASHTINGTON STATE

Area : EMBC HEADQUARTERS **EMBC Region :** HQ **MOE Region :**

Material(s): POTENTIAL RADIATION
Amount(s): UNKNOWN

Received From:

Caller A :	BRUCE	**Caller B :**	
Org :	WASHINGTON STATE EMO	**Org :**	
Phone :	Business 800-258-5590	**Phone :**	
Alternate :	Business	**Alternate :**	
Time :		**Time :**	

Received by EMBC Operations Officer : NICO **When Received :** 2017-05-09 11:02

Affected Environment : Ground **Other :**

Type of Spilling : **Other Spill Type :** Potential radiation

Accidents:

Sector: PRIVATE

Cause :
At 08:26 this morning DOE Handford Nuclear Facility had a tunnel that had a possible radiation breach. They are still doing a survey to determine if there has been a release. It is near their Purex Facility in the 200 east area. As of this time there is no indication of a release to the environment. Last update came to them at 10:21. No evacuations mentioned.

Response :

Jurisdiction : Federal, Provincial, Municipal

Task # : **Amount :** $ **Issued To :**

Notification :
1107-briefed MOE RO Pridham. Code 1 Muni/Prov/Fed.
1116-briefed NEEC/PDM
1117-emailed MOE Nanaimo/HQ.

Emergency Management BC

Dangerous Goods Incident Report (DGIR)

DGIR 170468 - UPDATE # 1

Type : INLAND UPDATE
Subject : POTENTIAL RADIATION (CODE 2)
Task # :
Assigned To :
Incident Area : EMBC HEADQUARTERS

Original Entry Logged : 2017-05-09 11:02
Amount : $
ASE Number :
EMBC Region : HQ
MOE Region :
MCTS# :

Location : DOE HANDFORD NUCLEAR FACILITY, WASHTINGTON STATE

Caller : DAVE PRIDHAM
Organization : MOE
Primary No :
Alt No :

This Update Logged : 2017-05-09 11:21
EMBC Operations Officer : NICO

Details :
Upgrading incident to a Code 2 for notification purposes, with an immediate downgrade.

Notification :
1122-briefed PDM. Advised that internal notifications to EMBC have been made. MOH is the lead agency in regards to information on the incident within British Columbia.
1150-briefed ECC Supervisor.
1200-emailed MOE Nanaimo/MOE HQ/Code 2 Dist. List.

Emergency Management BC

Dangerous Goods Incident Report (DGIR)

DGIR 170468 - UPDATE # 2

Type : INLAND UPDATE
Subject : POTENTIAL RADIATION (CODE 2)
Task # :
Assigned To :
Incident Area : EMBC HEADQUARTERS

Original Entry Logged : 2017-05-09 11:02
Amount : $
ASE Number :
EMBC Region : HQ
MOE Region :
MCTS# :

Location : DOE HANDFORD NUCLEAR FACILITY, WASHTINGTON STATE

Caller : RON EWANYSHYN
Organization : PDM
Primary No :
Alt No :

This Update Logged : 2017-05-09 12:00
EMBC Operations Officer : NICO

Details :
There has been a report of a Nuclear incident at the Hanford site in Washing State

We (BC) are not implementing our Nuclear Plan at this time. (in consultation with HLTH lead)

The HLTH EM Duty Officer has been and continues to be in contact with Washington State to get updates on the situation.

Most current information is :

- There has been radioactive material "released in tunnels"
- This is believed to be contained in the tunnel.
- They are escalating from an Alert state to >> Site Area Emergency

Best information at this time indicates materials are contained within the tunnel / this is a "shelter in place" scenario - at the local level

Notification :
1202-briefed MOE RO Pridham.
1210-emailed Original report, update 1 and update 2 to MOE Nanaimo/HQ/Code 2 Dist.

TRAN EMBC PDM TRAN:EX

From: Duffy, Chris D TRAN:EX
Sent: Tuesday, May 9, 2017 14:54
To: Anderson, Gordon A TRAN:EX; Denlinger, Becky TRAN:EX
Cc: Mohrmann, Ralph TRAN:EX; Watson, Andy GCPE:EX; Turner, Jordan GCPE:EX; TRAN EMBC PDM TRAN:EX; TRAN EMBC PECC Director 1 TRAN:EX
Subject: FW: BREAKING: Hundreds ordered to stay inside after tunnel collapse in Washington State
Attachments: purex.pdf

Follow Up Flag: Follow up
Flag Status: Flagged

fyi

From: Hannan, Andrew (PS/SP) [mailto:Andrew.Hannan@canada.ca]
Sent: Tuesday, May 9, 2017 13:29
To: GOC / COG (PS/SP); BOX-BC / BOITE-BC (PS/SP); Duffy, Chris D TRAN:EX
Subject: Fw: BREAKING: Hundreds ordered to stay inside after tunnel collapse in Washington State

Fyi

From: Loper, Sharon <Sharon.Loper@fema.dhs.gov>
Sent: Tuesday, May 9, 2017 1:26 PM
To: Hannan, Andrew (PS/SP)
Subject: RE: BREAKING: Hundreds ordered to stay inside after tunnel collapse in Washington State

Hello,

Below is the site for updates on situation:

http://www.hanford.gov/c.cfm/eoc/?page=290

Also, attached some info on the specific location of tunnel collapse.

-Sharon-

From: Hannan, Andrew (PS/SP) [mailto:Andrew.Hannan@canada.ca]
Sent: Tuesday, May 09, 2017 11:41 AM
To: Loper, Sharon <Sharon.Loper@fema.dhs.gov>
Subject: RE: BREAKING: Hundreds ordered to stay inside after tunnel collapse in Washington State

Thanks Sharon.

There is keen interest in this issue in our nation's capital.

As such, I would greatly appreciate it if you could keep flipping me any further updates.

Regards,

Andrew

From: Loper, Sharon [mailto:Sharon.Loper@fema.dhs.gov]
Sent: Tuesday, May 09, 2017 11:15 AM
To: Hannan, Andrew (PS/SP)
Subject: RE: BREAKING: Hundreds ordered to stay inside after tunnel collapse in Washington State

FYSA

From: Loper, Sharon
Sent: Tuesday, May 9, 2017 11:01:44 AM
To: Hannan, Andrew (PS/SP)
Subject: RE: BREAKING: Hundreds ordered to stay inside after tunnel collapse in Washington State

One correction - It's the inactive Hanford Facility where event occurred NOT the active power plant. Apologize.

-Sharon-

From: Loper, Sharon [mailto:Sharon.Loper@fema.dhs.gov]
Sent: Tuesday, May 09, 2017 10:56 AM
To: Hannan, Andrew (PS/SP)
Subject: RE: BREAKING: Hundreds ordered to stay inside after tunnel collapse in Washington State

Hello,

Our current spot report is attached. The Nuclear Power Plant's EOC has been activated to determine level of threat. An official determination of any release is pending. At this time, threat is being communicated as localized to the plant and directly impacted personnel. Safety protocols have been implemented for plant and, per their off-site plan, for the community. I will share when I hear more from State or County.

-Sharon-

Sharon Loper, Acting Regional Administrator
DHS FEMA Region X
425.487.4604 / Sharon.loper@fema.dhs.gov

TRAN EMBC PDM TRAN:EX

From: BOX-BC / BOITE-BC (PS/SP) <ps.box-bc-boite-bc.sp@canada.ca>
Sent: Tuesday, May 9, 2017 14:55
To: Aiden Ryan; Dropko, Andrea (CFIA/ACIA); Morin, Anne (PC); Baltej Dhillon; Smith, Barry (EC); Brian Martin; Caza, Caroline (EC); Chris Williams; Cindy Taylor-Blakely; David Lee; McCormack, David (NRCan/RNCan); Debi Letkemann; Maynard, Doug (NRCan/RNCan); Lemus, Gladis (HC/SC); Hannan, Andrew (PS/SP); Davies, Helen (PC); James Hill; James, Owen; Jasmir Basi; Rudisill, Jeni (PC); Joanne McNish; Kaden, Jody (AADNC/AANDC); Cassidy, John (NRCan/RNCan); Laurie Atherton; Cheng, Lo (EC); Dube, Lyne (WD/DEO); Krenz, Michael (IC); Spowart, Michael (PHAC/ASPC); Emergency_Management_Program / Emergency_Management_Program (NRCan/RNCan); 'Patty JAMISON'; Daley, Randall (CFIA/ACIA); Van Brabant, Reid (NRCan/RNCan); Lee, Robert (WD/DEO); Robin Steward; Roger Girouard; Ron Casey; Ron Perkio; Ryan Beattie ; posadziejewski, sabina (SSC/SPC); Sales, Catherine (AADNC/AANDC); Evani, Sharan (AAFC/AAC); Christie, Sharon (CFIA/ACIA); Stephen, Duncan (AADNC/AANDC); Olsen, Sue (PS/SP); Suneela Chopra; Switzer, Tom (WD/DEO); Trevor Baird; Tunice Tsui; Hirlehey, Wayne (PS/SP); DO, BCAANDC (AADNC/AANDC); Anita Barr; Castellan, Armel (EC); Bill Pleming; Croft, Brad (IC); Beech, Brian (HC/SC); Cal Currie; Canada Post West; Sales, Catherine (AADNC/AANDC); Charlene Underwood; Raymond, Chris (EC); Cindy Derrick; Cindy Jeromin; Danny Kilroe; Daradics, Anya (PS/SP); David Reid; DELBOSCO, Amy; Fahlman, Diane (PCH); DJ Lawrence; Ward, Donovan (IC); Stephen, Duncan (AADNC/AANDC); Duncan. Webb; MacKenzie2, Emily (AAFC/AAC); Gary Tiwana; Glenn Ormiston; Graham Gibson; Greg Anstruther; Greg Fortnum; Gurpinder Sidhu ; Heather McCarley; Jennifer Takahashi; Jim Farrell; Greenfield, Jim (PC); John Wiseman; JTFP; Kae Tsai; Hartley, Kevin (IC); Lauder, Janis (CFIA/ACIA); Carriere, Linda (EC); Coldwells, Lisa (EC); Louise Chayer-Ayers; Major David Baldwin; Major Joel Cote; Ulmi, Malaika (NRCan/RNCan); Marc Poirier; Marilyn Collins; MacDonald, Matt (EC); Myers, Melody (IC); Soucie, Michelle (AAFC/AAC); Miranda Wong; Nancy Hughes; Naomi Siegel; Cardinal, Nathan (PC); Hastings, Nicky (NRCan/RNCan); Smillie, Peter (PS/SP); Hill, Philip (NRCan/RNCan); Port of Vancouver; RCMP DEOC; Robin Neale; Neil, Ross (NRCAN/RNCAN); Hamilton, Russ (IC); Sarah Hughes; Sutherland, Sharon (NRCan/RNCan); Kamlade, Skylar (PS/SP); Irwin, Steve (NRCan/RNCan); Peters, Steven (CFP/PSC); Olsen, Sue (PS/SP); Robb, TK (SSC/SPC); Heron, Victoria (PS/SP); Hirlehey, Wayne (PS/SP); Drobina, Wojciech (HC/SC); Wylie, Maggie (PHAC/ASPC); YVR General
Cc: GOC / COG (PS/SP); Matheson, Bobby (PS/SP); TRAN EMBC PDM TRAN:EX; Hannan, Andrew (PS/SP); BOX-BC / BOITE-BC (PS/SP); PS.O EMPB BC Yukon Region / CB Yukon Région SGUP O.SP
Subject: Information Notice - Hanford Nuclear Facility Emergency Alert, Richland, WA
Attachments: PS-SP-#2232537-1-Information Notice -2017-014- Hanford Nuclear Facility Emergency Alert, Richland, WA .DOCX

Attached is the PS Pacific Regional Office (PRO) Information Notice 014 for the Hanford Nuclear Facility Emergency Alert, Richland, WA. This Notice was generated to provide an update on the current situation at the Hanford facility.

This will be the final PS PRO Information Notice unless situational changes warrant it. PS PRO will continue to monitor.

If you have any questions, please contact Anya Daradics at 604-666-1292 or 250-216-4372 or anya.daradics@canada.ca

Public Safety Canada Pacific Regional Office

Anya Daradics
Program Officer / Agente de programme
Emergency Management and Programs Branch / La gestion des urgences et des programmes
Pacific Region / Region Pacifique
Public Safety Canada / Sécurité publique Canada
Government of Canada / Gouvernement du Canada
Email: anya.daradics@canada.ca
Telephone: (604) 666-1292
BB: (250) 216-4372

To report an emergency contact the Government Operations Centre at 1-613-991-7000

Public Safety Canada, Pacific Regional Office - Information Notice

Classification: Unclassified
Dissemination Level[1]: 2

Threat/event Name: Hanford Nuclear Facility Emergency Alert, Richland, WA
Pacific Regional Office Incident Number: 014
GOC Event Number:

Date/Time: Information valid as of 9 May, 2017 at 12:45 hours *PST/PDT*
Information Notice Number:
Pacific Regional Office Activation Level[2]: Not activated

Description of current threat/event:

At 0849 PDT, 09 May, 2017, the Hanford Emergency Operation Center, from the Hanford Nuclear Facility located in Richland, WA notified the Region X Watch Center of an Emergency Alert. Initial notification was for loss of confinement that has potential for degradation of facility safety. Release to the outside environment is unknown and the situation is stable. The Department of Energy (DOE) is responding to the incident. The Hanford Fire Department is also on scene.

Subsequent alert notification described the following; Alert level notification was declared at the 200 East areas Plutonium Uranium Extraction Facility, (PUREX facility) due to concerns about subsidence in the soil covering the railroad tunnel near a former inactive chemical processing facility. The soil subsided in an area approx. 4 feet by 4 feet. The tunnels contain radiologically contaminated materials. The subsidence of soil was discovered during a routine surveillance of the areas by workers.

Radiological surveys are being conducted to determine if there is any release, however current estimates by the DOE is that there is no radiation release. Any potential release would be contained within the Hanford boundary. Winds are 2.5 mph from the North. Situation is localized to the Hanford Plateau.

- The Hanford EOC is operational.
- Washington State EOC is activated to Level 1.
- Benton and Franklin County EOCs are activated.
- FEMA Region 10 REP program is continuing to monitor the situation.

Source(s) of reporting: FEMA, Washington State Department of Energy, EMBC

Current Provincial Actions: EMBC in consultation with HLTH EM duty officer has confirmed that they will not be implementing their Nuclear Plan at this time, as this has been reported as a local site level incident. Both EMBC and HLTH Duty officers have been in touch with Wa State.

Current Federal Actions: PHAC Regional EPR coordinator is forwarding all information to HPOC.

NGO or Other's Actions:

Future actions:
Attachments/Links:
Next Information Notice:

This Information Notice is issued under the authority of the *Emergency Management Act* and is meant to advise federal departments and agencies of an incident that may, or is, requiring an integrated Government of Canada response in accordance with section 7 of the Federal Policy for Emergency Management may be required.

[1] Dissemination Level
DL1 – Releasable to Critical Infrastructure Partners and the Public

DL 2 – Releasable to All Federal Departments and Agencies
DL3 – Releasable to Authorized Organizations and Key Decision Makers
DL4 – Releasable to Authorized Federal Organizations
DL5 – No Further Dissemination Authorized

[2] Public Safety Regional Activation Levels
1 – Enhanced Reporting
2 – Risk Assessment and Planning
3 – Coordination of Federal Response

TRAN EMBC PDM TRAN:EX

From:	HLTH MOC Duty Officer HLTH:EX
Sent:	Tuesday, May 9, 2017 15:39
To:	Amanda Wirth-Pothier; Anderson, Kristy GCPE:EX; Boris Krasikov; Brown, Stephen R HLTH:EX; Caitlin McGuire; Duffy, Chris D TRAN:EX; Smith, Darrell R AGRI:EX; David Duchesne; XT:Tyndall, Dr. Mark HLTH:IN; Forge, Kathryn HLTH:EX; Francois Theriault; HEM Leadership Team; Henry, Bonnie HLTH:EX; JOC - Joint Operation Centre ; XT:Lavery, John HLTH:IN; Kendall, Perry HLTH:EX; Melissa Kia; Paton, Arlene HLTH:EX; Plank, Sarah GCPE:EX; Pridham, Dave ENV:EX; Mohrmann, Ralph TRAN:EX; Stevenson, Lynn HLTH:EX; Sue Olsen; Todd Bradford; TRAN EMBC PDM TRAN:EX; TRAN EMBC PECC Director 1 TRAN:EX; Wojciech Drobina
Cc:	Forge, Kathryn HLTH:EX; TRAN EMBC PECC Operations 4 TRAN:EX
Subject:	Washintong State Hanford Nuclear Site Incident - Update

B.C. health officials are monitoring the tunnel collapse at the Hanford Nuclear Facility in Southeast Washington State. The Province is in contact with state and federal agencies and there is no indication of a release of contamination at this point.

Crews continue to survey the area for potential contamination.

B.C.'s Nuclear Emergency Plan has not been activated for this event as there is no anticipated threat to British Columbia. BC Health Officials will continue to monitor as more information becomes available.

This will be the last update for Hanford Nuclear Incident, unless the situation changes.

Farrah Simpson
Provincial Health Duty Officer
BC Ministry of Health
24/7 Phone: 250-686-6061
Hlth.dutyofficer@gov.bc.ca

Fenton, Chrystal TRAN:EX

From: Duffy, Chris D TRAN:EX
Sent: Wednesday, July 5, 2017 14:02
To: Fenton, Chrystal TRAN:EX
Subject: FW: BREAKING: Hundreds ordered to stay inside after tunnel collapse in Washington State
Attachments: purex.pdf

Follow Up Flag: Follow up
Flag Status: Flagged

Further re the FOI request on Hanford tunnel collapse ...

C

From: Hannan, Andrew (PS/SP) [mailto:Andrew.Hannan@canada.ca]
Sent: Tuesday, May 9, 2017 13:29
To: GOC / COG (PS/SP); BOX-BC / BOITE-BC (PS/SP); Duffy, Chris D TRAN:EX
Subject: Fw: BREAKING: Hundreds ordered to stay inside after tunnel collapse in Washington State

Fyi

From: Loper, Sharon <Sharon.Loper@fema.dhs.gov>
Sent: Tuesday, May 9, 2017 1:26 PM
To: Hannan, Andrew (PS/SP)
Subject: RE: BREAKING: Hundreds ordered to stay inside after tunnel collapse in Washington State

Hello,

Below is the site for updates on situation:

http://www.hanford.gov/c.cfm/eoc/?page=290

Also, attached some info on the specific location of tunnel collapse.

-Sharon-

From: Hannan, Andrew (PS/SP) [mailto:Andrew.Hannan@canada.ca]
Sent: Tuesday, May 09, 2017 11:41 AM
To: Loper, Sharon <Sharon.Loper@fema.dhs.gov>
Subject: RE: BREAKING: Hundreds ordered to stay inside after tunnel collapse in Washington State

Thanks Sharon.

There is keen interest in this issue in our nation's capital.

As such, I would greatly appreciate it if you could keep flipping me any further updates.

Regards,
Andrew

From: Loper, Sharon [mailto:Sharon.Loper@fema.dhs.gov]
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To: Hannan, Andrew (PS/SP)
Subject: RE: BREAKING: Hundreds ordered to stay inside after tunnel collapse in Washington State

FYSA

From: Loper, Sharon
Sent: Tuesday, May 9, 2017 11:01:44 AM
To: Hannan, Andrew (PS/SP)
Subject: RE: BREAKING: Hundreds ordered to stay inside after tunnel collapse in Washington State

One correction - It's the inactive Hanford Facility where event occurred NOT the active power plant. Apologize.

-Sharon-

From: Hannan, Andrew (PS/SP) <Andrew.Hannan@canada.ca>
Sent: Tuesday, May 9, 2017 10:58:04 AM
To: Loper, Sharon
Subject: RE: BREAKING: Hundreds ordered to stay inside after tunnel collapse in Washington State

Thanks very much Sharon.

s.22

From: Loper, Sharon [mailto:Sharon.Loper@fema.dhs.gov]
Sent: Tuesday, May 09, 2017 10:56 AM
To: Hannan, Andrew (PS/SP)
Subject: RE: BREAKING: Hundreds ordered to stay inside after tunnel collapse in Washington State

Hello,

Our current spot report is attached. The Nuclear Power Plant's EOC has been activated to determine level of threat. An official determination of any release is pending. At this time, threat is being communicated as localized to the plant and directly impacted personnel. Safety protocols have been implemented for plant and, per their off-site plan, for the community. I will share when I hear more from State or County.

-Sharon-

Sharon Loper, Acting Regional Administrator
DHS FEMA Region X
425.487.4604 / Sharon.loper@fema.dhs.gov

Federal Emergency Management Agency (FEMA), Region 10 is committed to providing access, equal opportunity and reasonable accommodation in its services, programs, activities, education and employment for individuals with disabilities. To request a disability accommodation contact me at least five working days in advance at 425-487-4604 or Sharon.Loper@fema.dhs.gov.

From: Hannan, Andrew (PS/SP) [mailto:Andrew.Hannan@canada.ca]
Sent: Tuesday, May 09, 2017 10:37 AM
To: Loper, Sharon <Sharon.Loper@fema.dhs.gov>
Subject: FW: BREAKING: Hundreds ordered to stay inside after tunnel collapse in Washington State

Sharon,

I hope that you are well.

Do you have any further information on this?

Thanks.

Andrew J. Hannan
Regional Director
Public Safety Canada, Pacific Region
607-3292 Production Way, Burnaby, BC. V5A 4R4
Office: 604-666-1199, Cell: 604-353-4733

From: GOC / COG (PS/SP)
Sent: Tuesday, May 9, 2017 12:28:43 PM (UTC-05:00) Eastern Time (US & Canada)
To: PS.O GOC Planning / Planification COG O.SP; PS.F GOC SOO / APO COG F.SP
Cc: BOX-BC / BOITE-BC (PS/SP)
Subject: BREAKING: Hundreds ordered to stay inside after tunnel collapse in Washington State

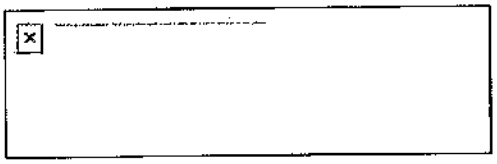
Please see below info from a media source :

- A possible nuclear crisis is playing out just south of the border. (South of Vancouver)
- Hundreds of workers at the Hanford Nuclear Site have been told to take cover.
- They have been ordered to stay inside buildings after a tunnel collapse.
- There's a risk of possible contamination.
- The site, which is located along the Columbia River, is a mostly decommissioned nuclear production complex operated by the US government.

The GOC is seeking more information and will forward updates as they are received.

Government Operations Centre

Centre des opérations du gouvernement
ps.goc-cog.sp@canada.ca



-----Original Message-----
From: COMDO / COMDO (PS/SP)
Sent: Tuesday, May 09, 2017 12:18 PM
To: GOC / COG (PS/SP); COMDO / COMDO (PS/SP)
Subject: FW: BREAKING: Hundreds ordered to stay inside after tunnel collapse in Washington State

-----Original Message-----
From: NEWS 1130 [mailto:ckwxam@listeneremail.net]
Sent: Tuesday, May 09, 2017 12:18 PM
To: COMDO / COMDO (PS/SP)
Subject: BREAKING: Hundreds ordered to stay inside after tunnel collapse in Washington State

NEWS 1130 BREAKING NEWS ALERT

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BREAKING: Hundreds ordered to stay inside after tunnel collapse in Washington State

There is a possible nuclear crisis is playing out just south of the border. Hundreds of workers at the Hanford Nuclear Site have been told to take cover.

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Fenton, Chrystal TRAN:EX

From: Duffy, Chris D TRAN:EX
Sent: Tuesday, May 9, 2017 11:42
Subject: Wa. State Incident
Attachments: BC Nuclear Emergency Plan 2015.pdf

Importance: High

Hi folks,

You may be aware of the incident below from Social media feeds ...

FYI

There has been a report of a Nuclear incident at the Hanford site in Wa. State.

We (BC) are not implementing our Nuclear Plan at this time. (in consultation with HLTH lead)

Our Provincial Duty Manager and the HLTH EM Duty Officer have been in contact with Wa. State.

Most current information is :

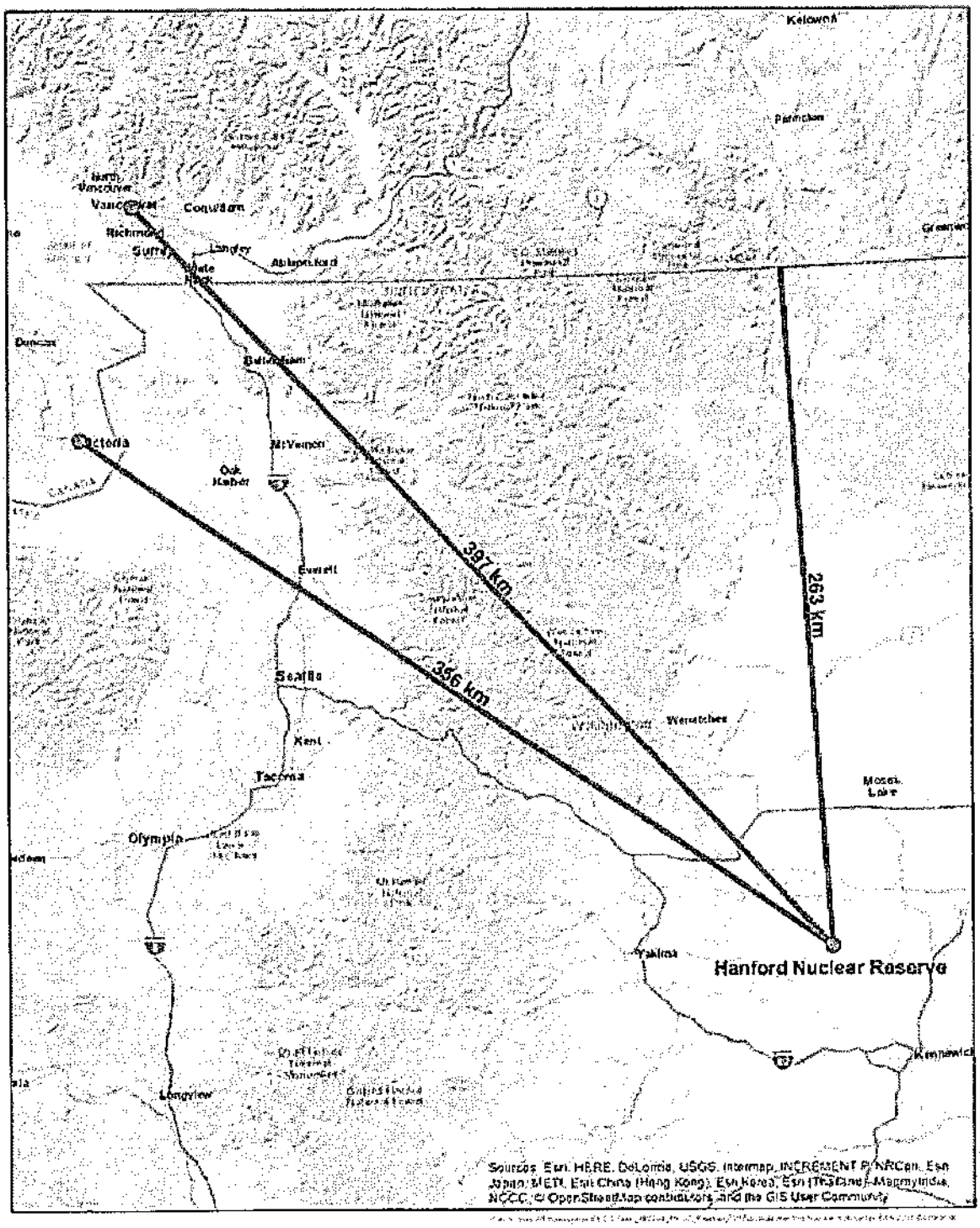
- There has been radioactive material "released in tunnels"
- This is believed to be **contained in the tunnel.**
- They are escalating from an ***Alert*** state to >> **Site Area Emergency**
- This is an **isolated – Site level incident**

Best information I have at this time is materials are contained within the tunnel / this is a "shelter in place" scenario - ***at the local level***

I'll advise with further info as available

Chris

Hanford Nuclear Reserve Distances



Christopher Duffy
Executive Director, Operations & Recovery Transition
EMERGENCY MANAGEMENT BRITISH COLUMBIA
Block A - Suite 200 2261 Keating X Road
Saanichton, BC CANADA V8W 2A5
Ph: 250.952.4544 Fax: 250.952.4888
24 hour Emergency Reporting: 1.800.663.3456
www.embc.bc.ca

From: HLTH MOC Duty Officer HLTH:EX
Sent: Tuesday, May 9, 2017 10:44
To: JOC - Joint Operation Centre (esqjocswo@forces.gc.ca); Duffy, Chris D TRAN:EX; Mohrmann, Ralph TRAN:EX; TRAN EMBC PECC Director 1 TRAN:EX; TRAN EMBC PDM TRAN:EX; 'todd.bradford2@forces.gc.ca'; 'james.brooks@bccdc.ca'; 'francois.theriault@canada.ca'; 'boris.krasikov@forces.gc.ca'; 'wojciech.drobina@canada.ca'; 'david.duchesne@canada.ca'; XT:Tyndall, Dr. Mark HLTH:IN; 'sue.olson@canada.ca'; 'melissa.kia@forces.gc.ca'; Smith, Darrell R AGRI:EX; Henry, Bonnie HLTH:EX; Kendall, Perry HLTH:EX; Paton, Arlene HLTH:EX; Stevenson, Lynn HLTH:EX; Plank, Sarah GCPE:EX; Anderson, Kristy GCPE:EX; 'wojciech.drobina@canada.ca'; Pridham, Dave ENV:EX
Cc: 'amanda.wirth-pothier@forces.gc.ca'; Forge, Kathryn HLTH:EX; XT:Lavery, John HLTH:IN; Caitlin.McGuire@phsa.ca; HEMBC Leadership Team (HEMBC_SLT@phsa.ca)
Subject: Unconfirmed Information - Possible Nuclear emergency in Washington State

The U.S. Department of Energy (DOE) Richland Operations Office activated the Hanford Emergency Operations Center in Washington State at 8:26 a.m., after an alert was declared at the 200 East Area. This is at the Hanford Nuclear Site. There are concerns about subsidence in the soil covering railroad tunnels near a former chemical processing facility. The tunnels contain contaminated materials.

Actions taken to protect site employees include:

- Facility personnel have been evacuated
- As a precaution, workers in potentially affected areas of the Hanford Site have gone indoors
- 09 May 2017

- **Latest Information**
- Responders are on the scene and are reporting the soil has subsided in an area approximately 20 feet by 20 feet over one of the tunnels next to the Plutonium Uranium Extraction Facility, also known as PUREX. There is no indication of a release of contamination at this point.

More information is available at http://www.hanford.gov/c.cfm/eoc/?page=290

We have been in contact with the WA State Department of Health Duty Officer and they will be provided a situation summary/update as soon as they are able to validate the information. The Provincial Health Duty Officer will continue to monitor with the HECC activated to a level 1.

The BC Nuclear Emergency Plan (attached) has NOT been activated at this time.

Melia Walker
Provincial Health Duty Officer
Ministry of Health
250-686-6061
Hlth.dutyofficer@gov.bc.ca

British Columbia

NUCLEAR EMERGENCY PLAN 2015

BRITISH COLUMBIA | Ministry of Health

PREAMBLE

This plan represents a joint effort between a number of agencies within the Province of British Columbia. While the risk of a nuclear emergency occurring in B.C. is low; it is acknowledged that there is a need to prepare for such an event. This document outlines the current state of provincial planning for nuclear emergencies and will be updated on a regular basis as lessons are learned through exercises and emerging best practices.

This plan has been approved as B.C.'s nuclear emergency plan.

PLAN MAINTENANCE

The ***B.C. Nuclear Emergency Plan*** and its supporting documents are managed and maintained by the emergency management unit of the British Columbia Ministry of Health.

Inquiries or comments on the ***B.C. Nuclear Emergency Plan*** or its supporting documents should be directed to:

EMERGENCY MANAGEMENT UNIT
BRITISH COLUMBIA MINISTRY OF HEALTH

1515 Blanshard Street
Victoria, B.C. V8W 3C8

Telephone: 250 952-2611
Facsimile: 250 952-2497

The ***B.C. Nuclear Emergency Plan*** and its supporting documents are evergreen documents. The plan will be reviewed periodically and updated as required. As part of this review, partners will be asked to provide any requests for modifications. Minor amendments will be approved by the B.C. Ministry of Health and the affected government institutions. Major updates will be sent to all partners for review and approval.

Requests for amendments to the plan must be submitted in writing to the above point of contact. Substantive changes to procedures, strategies, mandates or points of contact affecting the plan must be provided within 30 days of the changes taking effect.

AMENDMENTS AND CONTROL

The B.C. Ministry of Health's emergency management unit maintains a distribution list of all recipients of the ***B.C. Nuclear Emergency Plan***. Holders of the plan are responsible for verifying and maintaining current distribution information for their organization, and for informing the emergency management unit point of contact of any required changes to the distribution lists.

NOTE TO READERS

First occurrences in the text of terms listed in the Glossary are formatted in **Bold**. Titles of acts, plans and supporting documents are formatted in ***Italics***.

LIST OF AMENDMENTS

DATE *(m/yr)*	EDITION	SECTIONS AFFECTED	STATUS	INSERTED BY *(Name or initials)*

CONTENTS

PREAMBLE 02
PLAN MAINTENANCE 02
AMENDMENTS AND CONTROL 03
NOTE TO READERS 03

1 | **OVERVIEW** 09
1.1 PURPOSE 09
1.2 AUTHORITIES 09
1.3 SCOPE 09
1.4 RELATIONSHIP TO OTHER RESPONSE DOCUMENTS 10

2 | **PLANNING BASIS** 12
2.1 NATURE OF THE HAZARD AND RESPONSE 12
2.2 PLANNING FRAMEWORK FOR NUCLEAR EMERGENCY MANAGEMENT 13
2.2.1 *Response Goals* 13
2.2.2 *Planning Principles and Requirements* 13
2.3 CATEGORIES OF NUCLEAR EMERGENCIES AND PLANNING LINKS 14
2.3.1 *Category A: An Emergency at a Nuclear Power Plant In Canada* 14
2.3.2 *Category B: An Emergency at a Nuclear Power Plant or Research Reactor in the US or Mexico* 14
2.3.3 *Category C: An Emergency Involving a Nuclear-Powered Vessel in Canada* 16
2.3.4 *Category D: Other Nuclear Emergencies or Potential Threats in North America* 17
2.3.5 *Category E: A Nuclear Emergency Occurring Outside of North America* 18

3 | **PLANNING CONTEXT** 19

4 | **PREPAREDNESS** 21
4.1 DETECTION 21
4.2 TRAINING 21
4.3 EXERCISES 22
4.4 CAPABILITIES 22
4.5 RESOURCES 22

5 | KEY AGENCY ROLES AND RESPONSIBILITIES 23
5.1 SITE OPERATORS AND LICENSEES 23
5.2 FIRST RESPONDERS 23
5.3 LOCAL AUTHORITIES 24
5.3.1 *Health Authorities* 24
5.4 PROVINCE OF B.C. 25
5.4.1 *Ministry of Health and other Health System Organizations* 25
5.4.2 *Emergency Management BC* 26
5.4.3 *Ministry of Environment* 26
5.4.4 *Ministry of Agriculture* 26
5.4.5 *Government Communications and Public Engagement* 27
5.5 FEDERAL GOVERNMENT 27
5.5.1 *Public Health Agency of Canada* 27
5.5.2 *Health Canada* 27
5.5.3 *Department of National Defence / Canadian Armed Forces* 27
5.5.4 *Public Safety Canada* 28
5.5.5 *Canadian Nuclear Safety Commission* 28
5.5.6 *Federal Summary of Responsibilities* 28
5.6 FEDERAL COMMUNICATIONS 31
5.7 INTERNATIONAL 31

6 | RESPONSE STRUCTURE 32
6.1 ORGANIZATIONAL CHART 32
6.2 KEY RESPONSE STRUCTURES/ENTITIES 33
6.2.1 *B.C. Emergency Management System* 33
6.2.2 *Emergency Operations Centres* 33
6.2.3 *Provincial Regional Emergency Operations Centre/ Provincial Emergency Coordination Centre* 33
6.2.4 *Health Emergency Coordination Centre* 33
6.2.5 *Federal Nuclear Emergency Plan Technical Assessment Group* 34
6.2.6 *Federal Nuclear Emergency Plan Designated Officials and Response Teams* 34

7 | OPERATIONAL ELEMENTS 35
7.1 TECHNICAL ASSESSMENT 35
7.2 RISK COMMUNICATIONS 35
7.2.1 *Principles* 35
7.2.2 *Informing the Public* 36
7.3 ENVIRONMENTAL MONITORING 36
7.4 WORKER PROTECTION 36
7.5 COUNTERMEASURES/PROTECTIVE ACTIONS 36
7.6 MEDICAL RESPONSE 37
7.7 DE-ESCALATION AND THE TRANSITION TO RECOVERY 37

8 | RESPONSE PROTOCOLS 38

9 | FEDERAL/PROVINCIALACCOUNTABILITIES AND CO-ORDINATION 41
9.1 BCNEP/FNEP RESPONSE LEVELS AND TRIGGER CRITERIA 41
9.2 FEDERAL/PROVINCIAL NOTIFICATIONS 43
9.2.1 *Initial Notifications* 43
9.2.2 *Subsequent Federal Notifications and Fan-out* 43
9.2.3 *International Notifications* 44
9.3 COLLABORATIVE TECHNICAL ASSESSMENT 44
9.4 FEDERAL FIELD OPERATIONS IN SUPPORT OF B.C. 44
9.5 FEDERAL/PROVINCIAL LIAISON AND CO-ORDINATION. 45
9.5.1 *International Co-ordination* 45
9.5.2 *National Co-ordination* 45
9.5.3 *Federal-Regional Co-ordination* 46
9.5.3.1 *Regional Health Portfolio.* 46
9.5.3.2 *Health Portfolio Emergency Preparedness and Response Co-ordinator* 46
9.5.3.3 *Federal-Regional Emergency Management Structure* 46
9.5.4 *Federal- Provincial Co-ordination – Other Provinces and Territories* 47
9.6 FEDERAL COMMUNICATIONS 47
9.7 FEDERAL SUPPORT CONCERNING COUNTERMEASURES 47
9.8 FEDERAL SUPPORT FOR DE-ESCALATION AND RECOVERY 48
9.9 FNEP RESOURCES AND SERVICES 48
9.9.1 *Requesting FNEP Resources* 48

A | APPENDIX A *Bibliography* 49

B | APPENDIX B *Glossary* 50

C | APPENDIX C *Summary of Radiation Resources in B.C. Health Authorities** 54

D | APPENDIX D *Radiation In General.* 55

E | APPENDIX E *Common Communication Errors Made in Assessment of the Radiological Health Hazards (Iaea, 2013)* 56

F | APPENDIX F *Canadian Nuclear Safety Commission Recommended Turn-Back Dose Rates and Maximum Permissible Dose* 58

PREPAREDNESS 59

Training 59

Radiation Basics 59

Medical Emergency Treatment for Exposures to Radiation (METER) 59

G | APPENDIX G *Details of Federal Nuclear Emergency Plan Resources and Services* 59

Field Response Training 60

Exercises 60

Co-ordination Meetings 60

RESPONSE 61

Surveillance & Environmental Monitoring 61

Fixed-Point Surveillance Network 62

Canadian Radiological Monitoring Network 62

Comprehensive Nuclear Test-Ban Treaty Network 62

Mobile Monitoring Systems (aerial, vehicle -borne and ground surveys) 62

Mobile Nuclear Laboratories (MNLs) 63

Technical Assessments 63

Emergency Dosimetry Services 63

Biodosimetry and Bioassay 64

Population Monitoring 64

National Emergency Strategic Stockpile. 64

RECOVERY 65

Return to Routine Monitoring 65

ABBREVIATIONS

BCCDC	British Columbia Centre For Disease Control
BCERMS	British Columbia Emergency Response Management System
BCNEP	British Columbia Nuclear Emergency Plan
CBRNE	Chemical, Biological, Radiological, Nuclear And Explosives
CCG	Central Coordination Group
CNSC	Canadian Nuclear Safety Commission
DFATD	Department Of Foreign Affairs, Trade And Development
DND/CAF	Department Of National Defence/Canadian Forces
ECC	Emergency Coordination Centre
EMBC	Emergency Management British Columbia
ESF	Emergency Support Function
EOC	Emergency Operations Centre
FERMS	Federal Emergency Response Management System
FERP	Federal Emergency Response Plan
FNEP	Federal Nuclear Emergency Plan
FNEP TAG	Federal Nuclear Emergency Plan Technical Assessment Team
GCPE	BC Government Communications And Public Engagement
GOC	Government Operations Centre
HC	Health Canada
HECC	Health Emergency Coordination Centre
HEMBC	Health Emergency Management British Columbia
HPOC	Health Portfolio Operations Centre
MDEC	Ministers-Deputies Emergency Committee
HLTH	Ministry Of Health
NERS	National Emergency Response System
PECC	Provincial Emergency Coordination Centre
PHO	Provincial Health Officer
PREOC	Provincial Regional Emergency Operations Centre
PS	Public Safety Canada
RHAS	Regional Health Authorities

1 OVERVIEW

1.1 PURPOSE

The purpose of the ***B.C. Nuclear Emergency Plan*** is to describe the provincial response to an accidental or unintentional **nuclear emergency**, including the specific interfaces between B.C. local, regional, provincial, federal-regional and federal **emergency management organizations.**

While the plan is designed for accidental or unintentional events, elements of this plan may be used to address **radiological consequence management** of deliberate or malicious acts (see Section 1.3 Scope).

1.2 AUTHORITIES

The ***B.C. Nuclear Emergency Plan*** is prepared by the B.C. Ministry of Health under the authority of the provincial ***Emergency Program Act*** and the ***Emergency Management Program Regulation***. The act sets out the preparedness, response and recovery roles and responsibilities of the Province and local authorities. The regulation requires all provincial ministers to develop emergency plans and procedures, and designates key ministers for specific hazards.

Under Schedule 1 of the ***regulation***, the B.C. Minister of Health is designated as the key minister for "hazardous spills" involving radiation and is required to set out the manner in which and the means by which the provincial government will respond.

The ***Federal Nuclear Emergency Plan*** (FNEP) is issued under the authority of the federal Minister of Health, in accordance with the provisions of Article 9 of the federal *Emergency Management Act* (2007). The FNEP is a multi-departmental plan that is endorsed by designated deputy ministers, and agency presidents, on behalf of federal organizations that have specific responsibilities under the plan.

The designated roles and responsibilities for federal government institutions in the FNEP also apply to federal-regional organizations.

In accordance with the federal ***Emergency Management Act***, Section 9 (3), the FNEP B.C. annex constitutes a pre-existing arrangement between the Province of B.C. and the federal government to provide specific assistance (technical/scientific or operational) during a nuclear emergency.

1.3 SCOPE

The ***B.C. Nuclear Emergency Plan*** (BCNEP) is designed as a flexible, fully scalable provincial plan. The continuum of potential nuclear accidents in B.C. includes those that do not reach the threshold of an emergency, are handled by licensees and/or first responders, are managed within provincial capabilities, exceed provincial response capabilities and require federal assistance, or involve a federal mandate in the province. Components of the BCNEP may be used to support the response to any nuclear accident along this continuum. It is also important to note that there are many ***Federal Nuclear Emergency Plan*** (FNEP) resources and services that support overall preparedness and response to nuclear emergencies (see Appendix G).

This plan is focussed on accidental nuclear emergencies, but the arrangements herein may be used in support of the ***B.C. Chemical, Biological, Radiological, Nuclear or Explosive (CBRNE) Response Plan*** to support prevention and mitigation measures, provide technical support to planned events and no-notice security activities, and/or address radiological consequence management of deliberate or malicious acts.

The BCNEP uses the following nuclear emergency event categories to coincide with those used in the FNEP:

CATEGORY A: An emergency at a nuclear power plant in Canada;

CATEGORY B: An emergency at a nuclear power plant in the United States or Mexico;

CATEGORY C: An emergency involving a nuclear-powered vessel in Canada;

CATEGORY D: Other nuclear emergencies or potential threats in North America;

CATEGORY E: A nuclear emergency occurring outside of North America.

1.4 RELATIONSHIP TO OTHER RESPONSE DOCUMENTS

The BCNEP is designed to augment existing operational plans at many levels, e.g. licensees, site operators, first responders, and regional health authorities. It is one plan in a framework of related emergency plans, policies, procedures and agreements, including the following:

- *B.C. Emergency Management System (BCEMS)*: BCEMS is a provincial emergency management system founded on the principles of the Incident Management System and includes common language, span of control, and management by objective and scalability. It ensures a consistent, co-ordinated and organized response to emergency events and disasters, and is used across ministries and jurisdictions in British Columbia.

- *Comprehensive Emergency Management Plan (CEMP)*: B.C.'s CEMP consists of The All-Hazard Plan, support annexes and hazard specific annexes. *The All-Hazard Plan* outlines the operational structure and responsibilities of the Provincial Emergency Coordination Centre and the Provincial Regional Emergency Operations Centres managed by Emergency Management BC for all of government. The plan is the basis for the response to the danger, or risk, posed by all types of hazards in British Columbia.

  The response actions as outlined in the CEMP will guide the provincial integrated response for a nuclear incident/emergency.

- *Public Health and Medical Services Annex to The All-Hazard Plan*: This annex to the CEMP describes how the B.C. health system will respond to major emergencies or disaster events, including the provision of health care and the promotion and protection of public health.

- ***B.C. Chemical, Biological, Radiological, Nuclear and Explosives (CBRNE) Response Plan:*** The purpose of the plan is to outline the co-ordinated response of provincial, regional and municipal organizations to a CBRNE event where higher levels of federal or inter-provincial support may be required. It does not include response to a routine hazardous material event.

- *B.C. Hazardous Material Response Plan*: The plan is an integral facet of the B.C. Ministry of Environment's Environmental Emergency program and provides the approach that will be taken by the provincial government to the threat and occurrence of major accidental spills, emissions and discharges of hazardous materials into the environment.

- ***Cross-Border Health Emergency Management Arrangements***: B.C. has a number of cross-border memorandums of agreement and other arrangements to support cross-border collaboration, including:
  - *Memorandum of Understanding on Public Health Emergencies between British Columbia and Alberta*;
  - *Pacific Northwest Emergency Management Arrangement*;
  - *Memorandum of Understanding n Public Health Emergencies between the Province of British Columbia and the State of Washington*;
  - *Pacific Northwest Border Health Alliance*.
- *Federal Emergency Response Plan (FERP)*: This plan establishes overall governance for emergency management at the federal level, and includes the Federal Emergency Response Management System and the National Emergency Response System. Emergency support functions have been identified for federal departments.
- *Federal Nuclear Emergency Plan (FNEP)*: The FNEP is an annex to the FERP and, with the FERP, is the plan under which the Government of Canada will respond to a major nuclear emergency requiring a co-ordinated federal response in areas of federal jurisdiction, and in support of impacted provinces and territories. The FNEP supports rapid mobilization of federal radiological assessment and other specialized capabilities required to manage the potential health risks associated with radiological or nuclear emergency.
- *Canadian Guidelines for Intervention During a Nuclear Emergency*: The guidelines have been prepared as part of Health Canada's responsibilities as the lead department for the Federal Nuclear Emergency Plan. The guidelines developed apply primarily to countermeasures to be implemented by an off-site authority in the early phase of an emergency at a nuclear facility with potential off-site consequences. They are also applicable to other radiological or nuclear events. The counter measures considered are evacuation, relocation, sheltering, administration of stable iodine, and food controls.
- ***Statement of Intent Between the Department of Energy of the United States of America and the Department of Health Canada*** Regarding Nuclear and Radiological Emergency Management and Incident Response Capabilities (2014). The statement is not legally binding but does identify numerous areas of collaboration, including technical data exchange, plume modelling, and minimizing the consequences of radiological events.
- *Chemical, Biological, Radiological, Nuclear and Explosives (CBRNE) Resilience Strategy and Action Plan for Canada*: The purpose of this strategy is to provide the policy framework that will guide the creation of sustainable capabilities and common standards in CBRNE policies, programs, equipment and training.

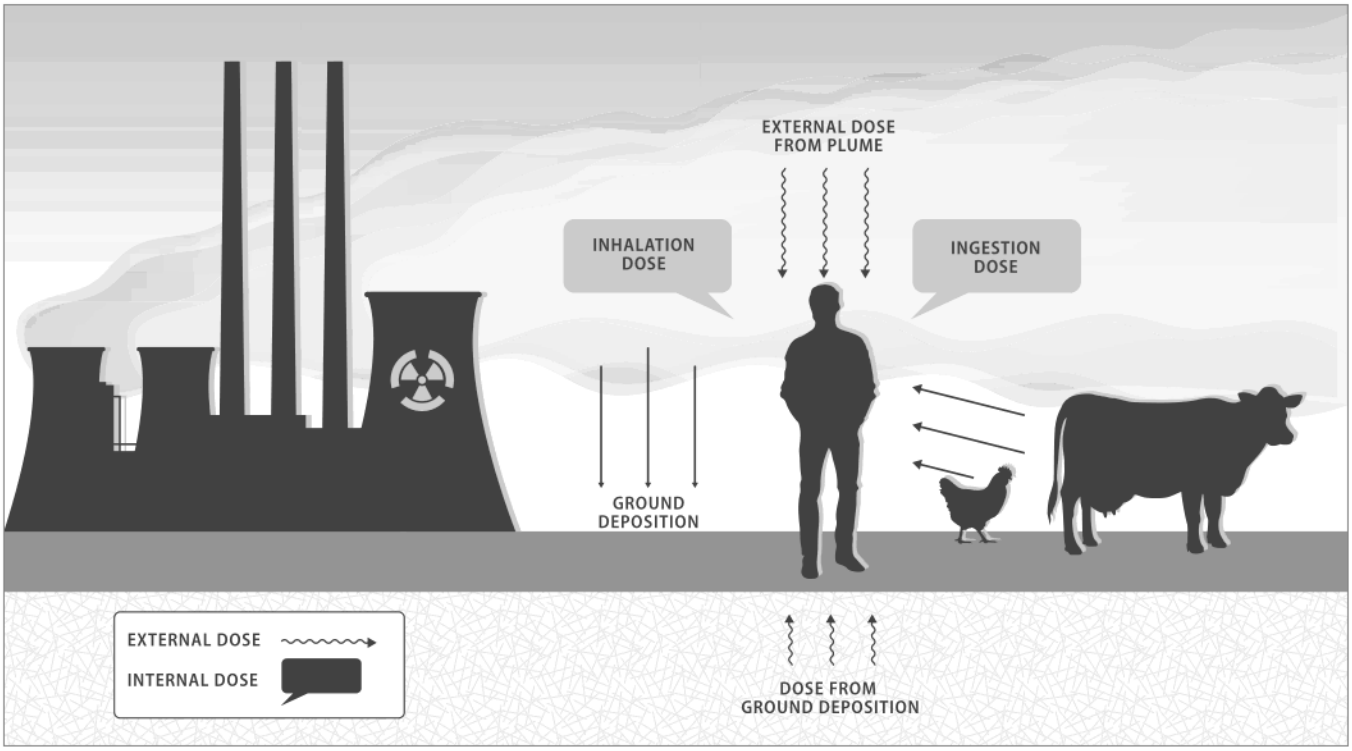
2 PLANNING BASIS

2.1 NATURE OF THE HAZARD AND RESPONSE

Radiation is energy that comes from a source and travels through material or space. Radiation can be classified as ionizing or non-ionizing. Ionizing radiation has sufficient energy to remove electrons from atoms or molecules. The loss of an electron results in the formation of a charged atom, called an ion. The ionization of molecules can lead to radiolysis (i.e., breaking chemical bonds and formation of highly reactive free radicals which in turn may react chemically with neighbouring materials even after the original radiation has stopped).

The average Canadian is exposed to 2-3 millisieverts (mSv) of background radiation annually (e.g., from radon, rocks and soil, food, cosmic radiation from space). A CT scan can expose a patient to between 5 and 30 mSv (Health Canada, 2012). Only very high levels of exposure to radiation cause any acute health effects (e.g., *hematopoietic, gastrointestinal and/or neurological/vascular* syndrome). Radioactive materials are detected using detection instrumentation applicable to the type of radiation present (i.e., alpha, beta, gamma and/or neutron). Appendix D provides more information on radiation in general.

The hazards associated with an emergency covered by this plan are the actual or potential radiological impacts on health, safety, property and the environment resulting from an uncontrolled release of radioactive material into the environment that may result in public exposure above regulatory or guideline levels. Such exposures may be short-term or long-term and may be received through various pathways (see Figure 1).



Response to nuclear emergencies requires timely interventions or protective actions to reduce or control the magnitude, duration and pathways of exposure and to mitigate the impacts on health, safety, property and environment. As emergency interventions may carry their own risks and costs, they should be optimised to maximize the benefit of the interventions and keep any resulting doses (e.g., for first responders) and residual radiological risk **"as low as reasonably achievable,"** taking into consideration economic and social factors (International Commission on Radiological Protection, 2009).

2.2 PLANNING FRAMEWORK FOR NUCLEAR EMERGENCY MANAGEMENT

2.2.1 *Response Goals*

In addition to the goals outlined in B.C. Emergency Management System, the International Atomic Energy Agency (2002) identifies the following practical goals of response to a nuclear emergency at all levels of jurisdiction:

- Regain control of the situation;
- Prevent or mitigate consequences at the scene;
- Prevent the occurrence of acute deterministic radiological health effects in workers and the public;
- Render first aid and manage the treatment of radiation injuries;
- Prevent, to the extent practicable, the occurrence of long-term stochastic radiological health effects (e.g., cancer) in the population;
- Prevent, to the extent practicable, the occurrence of non-radiological effects on individuals and among the population;
- Protect, to the extent practicable, property and the environment; and
- Prepare, to the extent practicable, for the resumption of normal social and economic activity.

2.2.2 *Planning Principles and Requirements*

Nuclear emergency management activities and measures are based on international safety standards and guidance. The objective of these preparations is to execute the following essential elements of a nuclear emergency response in a manner that is effective, timely and co-ordinated.

B.C.'s response will implement the following principles at a provincial level:

- Identification of an emergency or potential emergency situation, initial assessment, and notification;
- Implementation of co-ordinated response structures and preparation for mobilisation of resources upon receipt of notification;
- Arrangements made for the protection of emergency workers;
- Provision of accurate and complete information on all aspects of the event to the appropriate government departments and agencies, elected officials, other countries, international organizations, the media and the public;
- Implementation of optimized protective actions to protect health, safety, property and the environment from a variety of radiological hazard;
- Mobilization of necessary resources, including logistics, scientific and communication resources over the duration of the emergency to mitigate the radiological consequences;
- Provisions for human and environmental radiological monitoring, and dose assessments;
- Co-ordination of national emergency arrangements and capabilities with international emergency arrangements;
- Preparation for the transition from an emergency situation to recovery;
- Involvement of relevant parties during all phases of emergency management; and
- Provision of accurate and appropriate public information.

2.3 CATEGORIES OF NUCLEAR EMERGENCIES AND PLANNING LINKS

The ***Federal Nuclear Emergency Plan*** divides nuclear emergencies into categories according to the potential scope of impacts on Canada and the scale of federal response expected for a severe event.

To ensure consistency, the ***B.C. Nuclear Emergency Plan*** follows federal categories. This section identifies the planning links for these categories.

2.3.1 *CATEGORY A: An Emergency at a Nuclear Power Plant In Canada*

Category A includes all major nuclear emergencies occurring at nuclear power plants (or the Chalk River Laboratory) in Canada that could lead, or have led, to off-site radiological consequences and could require the implementation of emergency plans by affected utilities, municipalities/regions and provinces. Category A emergencies have the potential to require the most comprehensive federal government response due to their potential scope, and the corresponding federal role for regulation, nuclear liability, and interprovincial and international liaison.

Provinces that could be most impacted by a nuclear emergency at a licensed nuclear power plant in Canada are Ontario, Quebec, New Brunswick, and Nova Scotia, which host such facilities or are within a few hundreds of kilometres of Canadian nuclear power plants. B.C. does not have a nuclear power plant and the closest Canadian nuclear power plant is in Ontario. A Category A incident anywhere in Canada would likely have economic and trade implications for the whole country (e.g., food exports).

2.3.2 *CATEGORY B: An Emergency at a Nuclear Power Plant or Research Reactor in the US or Mexico*

Category B events are major nuclear emergencies at nuclear power plants or research reactors outside Canada but within North America. These events could have direct and indirect impacts on Canada or Canadians in the United States or Mexico, or could result in requests for assistance under bi- or multilateral international agreements. Such events could require the implementation of emergency plans by affected municipalities/regions in B.C. and the ***B.C. Nuclear Emergency Plan*** (BCNEP). Of particular relevance for the BCNEP are the Columbia Generating Station, the Hanford Site and the Washington State University reactor, all of which are located in Washington State.

The Province would consider activating the Pacific Northwest Emergency Management Arrangement (PNEMA), an inter-jurisdiction agreement between Alaska, Idaho, Oregon, Washington, the Yukon and British Columbia for co-operating during emergency events, including the provision of emergency management assistance requested by the impacted member jurisdiction. In a nuclear event, B.C. would verify the need for assistance and contact PNEMA's International Coordination Group (ICG). The ICG exercises overall co-ordination and control of all activations of the PNEMA system and, therefore, would co-ordinate among PNEMA leadership and B.C., and compile resource lists offered by member signatories.

Relevant portions of the ***Federal Emergency Response Plan*** and the ***Federal Nuclear Emergency Plan*** will be used to support the domestic and international response, including the provision of support to B.C. and to the Department of Foreign Affairs, Trade and Development. Actions could include responding to requests from B.C. for assistance with risk assessments, trans-boundary consequence management and protective actions, protecting Canadians living or travelling in the affected areas, and controlling food and material imports into Canada.

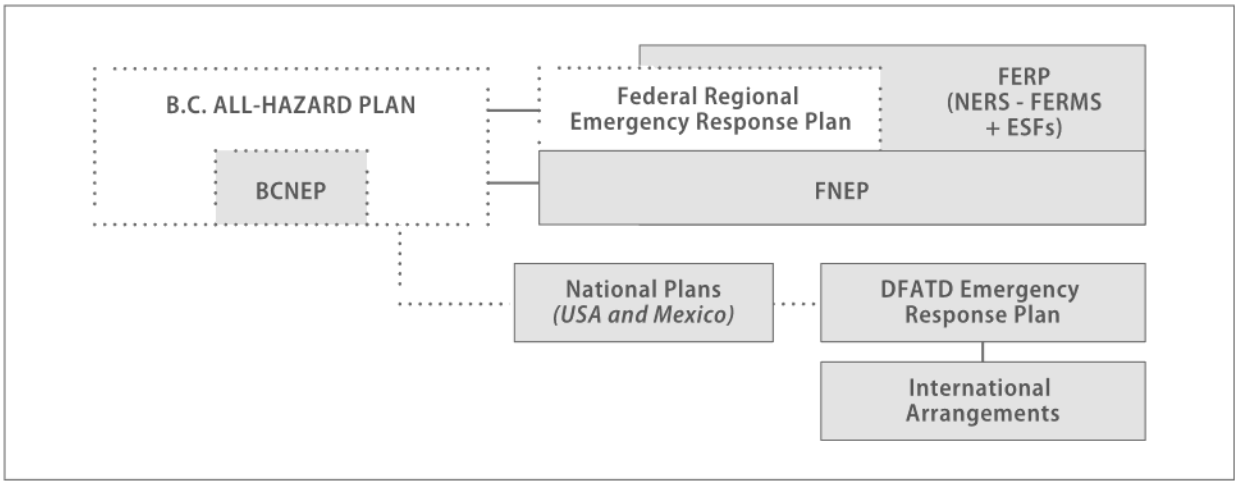


FIGURE 2: *Planning relationships for* CATEGORY B *emergencies at a nuclear power plant or research reactor in the United States or Mexico. Dashed lines indicate inclusion as applicable.*

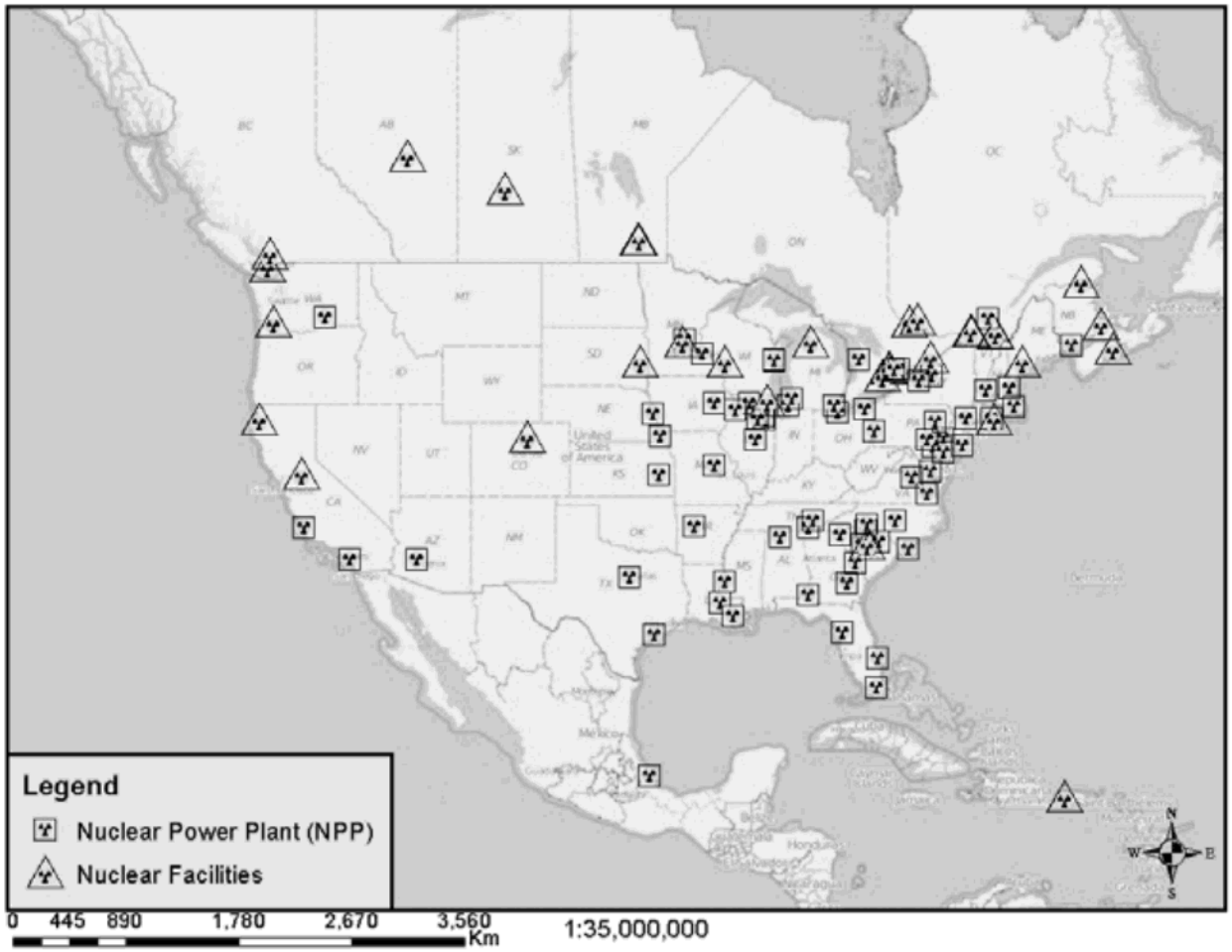


FIGURE 3: *Nuclear power plants and facilities in North America*

2.3.3 *CATEGORY C: An Emergency Involving a Nuclear-Powered Vessel in Canada*

Category C includes emergencies involving nuclear powered vessels or vessels carrying fissionable material in port or in transit in Canadian waters. The Department of National Defence and the Canadian Armed Forces (DND/CAF) is responsible for overseeing the safety of visits of foreign military nuclear-powered vessels to Canadian ports, and is the Canadian on-site authority in the event of an emergency. Category C events could require the implementation of emergency plans by affected municipalities, including the application of urgent protective actions. In B.C., there are only two ports authorized to host a military nuclear powered vessel – Canadian Forces Base Esquimalt and the Canadian Forces Maritime Experimental and Test Ranges at Nanoose Bay.

The ***Federal Nuclear Emergency Plan*** may be implemented on the specific request of DND/CAF and/or B.C., via the Government Operations Centre. The federal government will be responsible for communication with the international community according to established arrangements.

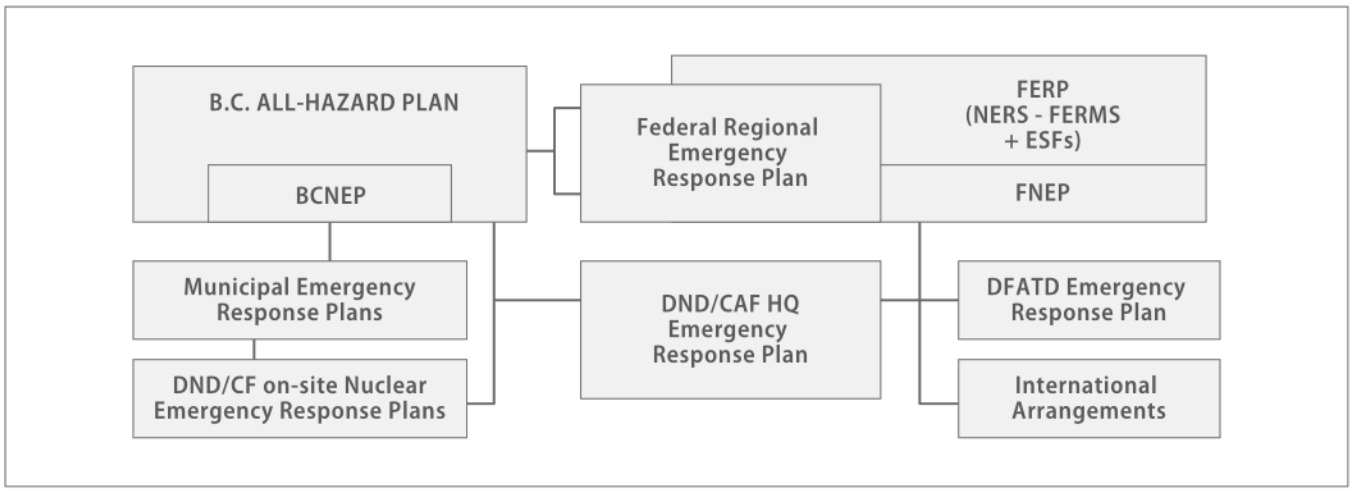


FIGURE 4: *Planning relationships for* CATEGORY C *emergencies involving a nuclear-powered vessel in Canadian waters.*

2.3.4 *CATEGORY D: Other Nuclear Emergencies or Potential Threats in North America*

Category D includes other nuclear emergencies or potential threats in North America that may require a multi-departmental or multi-jurisdictional response to deal with radioactive contamination or exposure of people, property and the environment. Examples of Category D events include, but are not limited to:

- Events involving nuclear facilities (e.g., research reactors such as the TRI-University Meson Facilities laboratory in Vancouver), ports, or activities (e.g., during transportation or licensed use of nuclear devices or radioactive substances) in B.C.;
- Inadvertent dispersal of radioactive contamination (e.g., a re-entry of a nuclear-powered satellite);
- Widespread radioactive contamination of food supplies, property or the environment;
- Malicious acts resulting in human exposure to unshielded radiological sources (when elements of the FNEP and BCNEP may be used in conjunction with other plans).

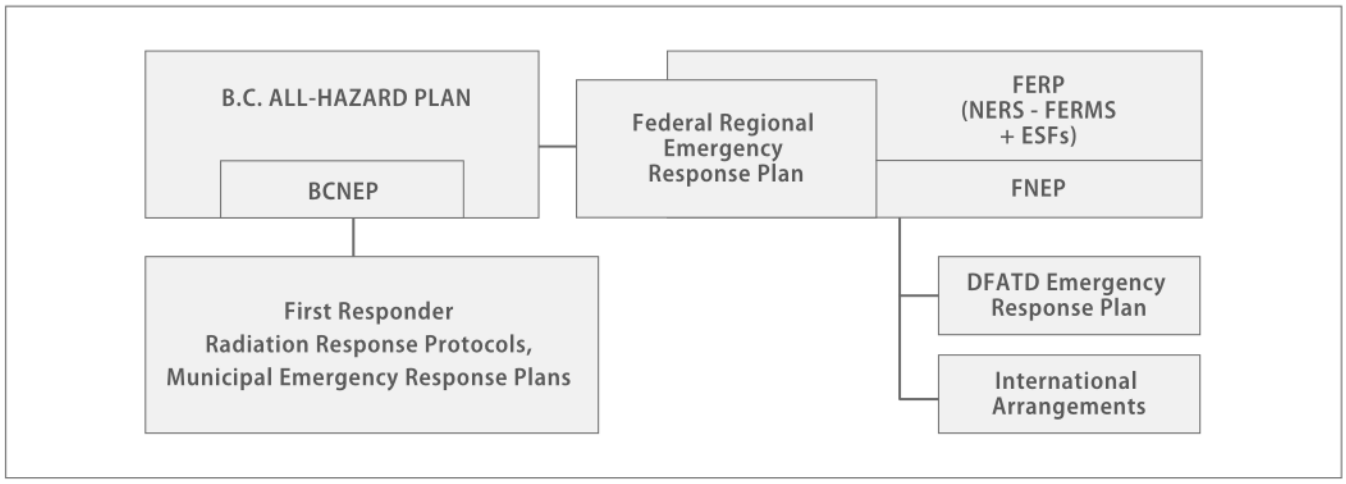


FIGURE 5: *Planning relationships for* CATEGORY D *– other serious nuclear emergencies or threats to North America. Dashed lines indicate inclusion as applicable/appropriate.*

2.3.5 *Category E: A Nuclear Emergency Occurring Outside of North America*

Category E includes all nuclear emergencies outside of North America. Such an emergency would be unlikely to require urgent protective actions or restrictions of food grown in Canada. However, an emergency distant from Canada may still require a co-ordinated and sustained federal and provincial response to deal with both international and domestic issues even if the direct radiological impacts on Canadian soil are calculated to be limited. In this instance, the Department of Foreign Affairs, Trade and Development will co-ordinate Canada's response to the emergency outside of North America.

The main focus of the response from other federal partners will be on assessing the radiological impact and protecting Canadians living or travelling in the affected country(ies), providing advice and implementing protective actions for diplomatic staff and Canadian citizens abroad, assurance monitoring for conveyances and travellers arriving in Canada, control of food and material imports into Canada from the affected areas, assessing direct and indirect impacts on Canada, and informing the public.

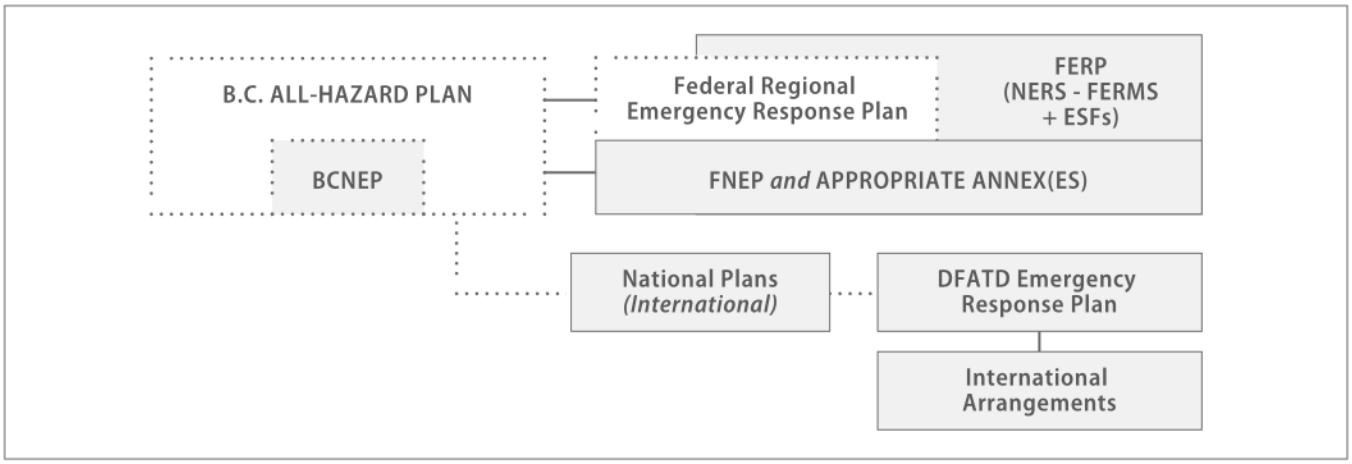


FIGURE 6: *Planning relationships for a* CATEGORY E *nuclear emergency outside North America. Dashed lines indicate inclusion as applicable/appropriate*

3 PLANNING CONTEXT

Provinces that have nuclear power plants have developed specialized plans and extensive capabilities to address the potential for a major nuclear accident. B.C. manages other major risks (e.g. floods, fires) and recognizes nuclear accidents as a potential hazard of low risk for B.C., for which the province has minimal capability to respond. In addition, there are few resources located in British Columbia.

Table 1 outlines planning implications for B.C. with respect to each category of nuclear emergency.

This planning environment reinforces the need to:

- Maximize the use of existing operational plans and limited capabilities;
- Maximize inter-sectoral co-ordination to undertake rapid, integrated technical assessment in the event of an accidental nuclear emergency potentially affecting B.C. (see Section 7.2 Technical Assessment);
- When required, act promptly to undertake protective actions (see Section 7.5 Countermeasures/Protective Actions);
- When required, act quickly to establish environmental monitoring (see Section 7.3 Environmental Monitoring); and
- Ensure principled, sound risk communication (see Section 7.2 Risk Communication).

CATEGORY OF NUCLEAR EMERGENCY	CONTEXT	PLANNING IMPLICATIONS FOR B.C.
A: AT A NUCLEAR POWER PLANT IN CANADA	B.C. does not have a nuclear power plant, and the closest Canadian nuclear power plant is in Ontario. Ontario's Chalk River research reactor is the largest in Canada and would also be included in this category.	▸ The BCNEP would likely not be activated, but the technical assessment, risk communications and environmental monitoring components could be used.
B: AT A NUCLEAR POWER PLANT OR RESEARCH REACTOR IN THE US OR MEXICO	The closest US nuclear power plant to B.C. is the Columbia Generating Station on the Hanford Site near Richland in southeastern Washington State, over 400 km from British Columbia. It is a boiling water reactor that delivers about 10% of the state's power supply. The Hanford Site is also undergoing extensive cleanup following the years when it had nine reactors that produced plutonium for the US defense program. Washington State University in Pullman, about 300 km from B.C., has the only research reactor in the state. This is a large research reactor, similar to that of Chalk River, and therefore is included in this category.	▸ A worst case emergency in this category (e.g., a severe accident at the Columbia Generating Station nuclear power plant), could eventually result in complex patterns of contamination of food, milk and rainwater several hundred kilometres away (IAEA, 2013). While this situation would not involve urgent treatment or evacuations, the BCNEP would likely be activated with a focus on technical assessment, environmental monitoring, protective actions (e.g., food and water restrictions) and risk communications.
C: INVOLVING A NUCLEAR-POWERED VESSEL	Foreign nuclear powered vessels occasionally dock at Esquimalt or Canadian Forces Maritime Experimental and Test Range outside Nanoose Bay on Vancouver Island, a few times a year on average.	▸ Naval reactors have considerably lower power ratings and contain less radioactive material than nuclear power plants, and operate at low or zero power while alongside a Canadian naval port. ▸ However, a catastrophic accident could result in a release of radioactive material causing injuries to those nearby if protective actions are not taken. Several jurisdictions would be involved in managing the response, and the BCNEP would be activated with a focus on technical assessment, protective actions and risk communications.
D: OTHER EMERGENCIES OR THREATS IN B.C. OR ELSEWHERE IN NORTH AMERICA	B.C. currently has two particle accelerators – at the TRI-University Meson Facility in Vancouver, and at Redlen Technologies in Saanich on Vancouver Island. Accelerators have no impact on the environment. The University of Albert at Edmonton has a small SLOWPOKE II zero power research reactor, unlikely to have any impact on B.C. environment. Although highly unlikely, road accidents involving vehicles transporting nuclear or radioactive material across B.C. should be considered in the emergency plan. Such accidents, if they do occur, would have limited radiological consequences as the containers are designed to sustain the most extreme mechanical thermal shocks. There are over 250 federal licences in B.C. for nuclear substances and radioactive devices with, for example, universities, labs, hospitals, and mining companies. The Canadian Nuclear Safety Commission's Licensee Database is available at: *www.nuclearsafety.gc.ca/eng/nuclear-substances/licensing-nuclear-substances-and-radiation-devices/licence-search/index.cfm* The Vancouver Fraser Port Authority in the Lower Mainland is the largest port by tonnage in Canada and the fourth largest in North America. The Puget Sound Naval Shipyard in Bemerton, Washington, has been recycling nuclear powered ships and submarines since 1990. It is about 100 km from Victoria.	▸ Most accidents in this category in B.C. have only localized impact, and are handled by on-site or on-scene emergency personnel or local first responders. ▸ A worst case accident in this Category could result in a release of radioactive material that could cause injuries and deaths to those nearby if protective actions are not taken. Several jurisdictions would be involved in managing the response, and the BCNEP would be activated with a focus on technical assessment, protective actions and risk communications.
E: Outside North America	Small quantities of radioactive material, if any, would be expected to reach Canada and would likely not pose a risk to health, safety, property or the environment.	▸ The BCNEP would likely not be activated, but the technical assessment, risk communications and environmental monitoring components could be utilized.

4 PREPAREDNESS

Given the planning context described in the previous section, preparedness for nuclear accidents in B.C. relies heavily on existing plans, infrastructures and networks that support readiness for all hazards. This section describes preparedness activities and capabilities that are specific to nuclear threats.

4.1 DETECTION

The purpose of detection is to identify contamination in the air or on the ground in the event of an atmospheric release of radioactive material. Ongoing monitoring of the background radiation described in Section 2.1 Nature of the Hazard and Response, is a key aspect of preparedness.

Health Canada's Fixed Point Surveillance (FPS) network is a network of real-time radiation detection equipment located across Canada and a single *Data Centre* in Ottawa, which collects, analyses and reports the data measured at each of these monitoring stations (See Appendix G for more information). As of 2014, there are six FPS stations at the following locations in B.C.:

- Saanich
- Metchosin
- Victoria
- Nanaimo
- Sidney
- Vancouver

In addition to the FPS network, when a nuclear powered submarine is berthing at a jetty, the Department of National Defence/Canadian Armed Forces (DND/CAF) install a radiation monitoring systems on the jetty and DND/CAF would conduct a survey off-base in case of an emergency. Data from these systems are available on a secure website.

4.2 TRAINING

Radiation emergencies do not occur frequently and pose specific challenges for responders. As such, all agencies that could potentially be involved in responding to an incident should undertake training in the radiation, detection and appropriate use of personal protective equipment.

Section 4.2 of the ***B.C. Chemical, Biological, Radiological, Nuclear and Explosives Response Plan*** describes the capability development needed to support response capacity under the ***B.C. Nuclear Emergency Plan***. This includes local/regional training and exercise programs, and provincial interoperability training.

The Justice Institute of B.C. and Royal Roads University provide a wide range of training options in emergency management. DND/CAF provides training related to nuclear powered vessels. Health Canada can provide or recommend third-party training for the following courses:

- *Radiation Basics:* a short course, available electronically, on radiation and radioactive decay, how radiation exposure occurs, and protective measures that can be taken to reduce exposure.
- *Nuclear Emergency Response Management:* a three day course, offered by DND/CAF, which provides the basic knowledge required to respond to a nuclear-powered vessel reactor and weapon emergency.
- *Medical Emergency Treatment for Exposures to Radiation:* a course that targets first responders and receivers, introducing the concepts of radiation, radiation biology and personal protective equipment used with radiation.
- *Field Response Training:* an intensive, week-long course that provides training in both radiation/ radioactive decay theory and field techniques for detecting and removing radioactive materials.

4.3 EXERCISES

The development of the ***B.C. Nuclear Emergency Plan*** (BCNEP) was informed by scenario-based planning sessions with key stakeholders, and all involved agencies share a strong commitment to exercising and continually updating and improving emergency plans. DND/CAF in Esquimalt regularly exercise their plans related to nuclear powered vessels and welcome the presence of provincial and local stakeholders as participants and observers.

Efforts should be undertaken to regularly exercise sections of the BCNEP. The Ministry of Health can lead the co-ordination of exercises with participants from local governments, First Nations, first responders, health authorities, provincial ministries, DND/CAF and federal departments, as appropriate.

4.4 CAPABILITIES

Section 4.2 of the ***B.C. Chemical, Biological, Radiological, Nuclear and Explosives Response Plan*** describes the capability development needed to support response capacity under the BCNEP.

Appendix C provides an overview of resources and capabilities in the health authorities concerning the management of radio-nuclear accidents in British Columbia.

4.5 RESOURCES

Preparedness for nuclear accidents is informed by an extensive international knowledge base, including numerous peer-reviewed journals and the following resources:

- A series of *Radiation Issue Notes* developed by the BC Centre for Disease Control;
- *Information on clinical, analytical, and consumer radiation* provided online by Health Canada;
- *Extensive educational resources* provided online by the Canadian Nuclear Safety Commission;
- *Standards, guides, fact sheets and books* available through the International Atomic Energy Agency;
- Resources available through the Oak Ridge Institute for Science and Education's *Radiation Emergency Assistance Center/Training Site (REAC/TS)*;
- Canadian Nuclear Laboratories *Nuclear Review* publications;
- Canada's *Radiation Research Journal*.
- International Atomic Energy Agency's "Criteria for Use in Preparedness and Response for a Nuclear or Radiologic Emergency (2011)" *Criteria for Use in Preparedness and Response for Nuclear or Radiological Emergency*.

Agencies can use these and other resources to enhance their readiness to respond.

5 KEY AGENCY ROLES *and* RESPONSIBILITIES

5.1 SITE OPERATORS AND LICENSEES

Operators of nuclear generating stations, research reactors, licensed nuclear facilities and licensed activities in Canada are responsible for safe operations and for on-site or on-scene emergency management. This is performed within the regulatory framework overseen by the Canadian Nuclear Safety Commission (CNSC) for civilian nuclear activities and/or by the Department of National Defence and the Canadian Armed Forces (DND/CAF) for activities within its authority.

Nuclear research facilities and licensees are required to set up and maintain the organization, equipment and response procedures necessary to meet the functions and responsibilities required by the CNSC pursuant to the *Nuclear Safety and Control Act* (1997) and its regulations for Class I and II nuclear facilities. Site operator/licensee emergency plans must include notification to CNSC, local authorities and first responders as appropriate.

DND/CAF is excluded from the application of the act and its regulations. However, DND/CAF maintains requirements that are consistent with those established under the act and its regulations. DND/CAF maintains the organization, equipment and response procedures necessary to respond to a nuclear emergency onboard a nuclear-powered vessel, including the requirement to notify local authorities.

All persons who handle, offer to transport, transport or receive nuclear substances in B.C. must comply with the CNSC's *Packaging and Transport of Nuclear Substances Regulations* and the *Transportation of Dangerous Goods Regulations*. These regulations include the requirement to immediately notify CNSC and any licensee associated with the material, in the event of an accident.

The site operator/licensee (for licensed facilities), or on-scene responders (for other events) will manage the on-site or on-scene response.

5.2 FIRST RESPONDERS

First responders work at the site level of an event and include police, fire and ambulance. B.C.'s *All-Hazard Plan* describes the general roles and responsibilities of first response organizations. The B.C. Emergency Health Services is part of the provincial health system and is also described in the *Public Health and Medical Services Annex*.

The RCMP is designated as the lead agency for terrorist Chemical, Biological, Radiological, Nuclear and Explosives (CBRNE) events and if they are the police of jurisdiction, they are the lead agency for criminal CBRNE events. However, they can also assist other agencies during a non-terrorist or non-criminal CBRNE event. All requests for RCMP CBRNE assistance during a CBRNE event should be forwarded through the local police.

First responder organizations have their own radioactive material response protocols based on resources like those developed by the BC Centre for Disease Control, and/or the Canadian Nuclear Safety Commission.

First response to a potential nuclear accident is based on the protection principles of reducing exposure time, maintaining maximal practical distance from the source and shielding. Typical steps include:

- Reconnaissance and notification;
- Using radiation detection instruments;
- Establishing hot, warm and cold zones;
- Using personal protective equipment;
- Extraction and decontamination; and
- Transport to hospital.

5.3 LOCAL AUTHORITIES

Local authorities include municipalities, regional districts and First Nations communities with treaty agreements. Local authorities hold primary responsibility for emergency planning, response and recovery within their jurisdictions. Although not required, some treaty First Nations communities have formal agreements with neighbouring jurisdictions regarding emergency services and programs.

Under Section 9(2) and 9(3) of B.C.'s *Emergency Program Act*, local authorities must develop emergency plans for response and recovery as well as establish an emergency management organization to develop and implement emergency plans and other preparedness, response and recovery measures. The *Local Authority Emergency Management Regulation* requires local authorities to prepare emergency plans which reflect and are based on the potential emergencies and disasters that could affect all or any part of their jurisdictional area.

5.3.1 *Health Authorities*

The health system in B.C. includes five regional health authorities, the First Nations Health Authority, and the Provincial Health Services Authority, which includes Health Emergency Management BC, B.C. Emergency Health Services and B.C. Centre for Disease Control. Health authorities are the operational arm of the provincial health system, delivering emergency, acute, public health, environmental health, community care and mental health services.

Hospitals, administered by the regional health authorities, operate a number of programs that could be used in response to a nuclear emergency. Hospitals may draw upon existing decontamination plans and protocols based on the nature of the situation and available resources. Hospitals may also be seen as a source of knowledge, screening and medical countermeasures, and will work closely with their nuclear medicine subject matter experts in the event of a nuclear accident. Regional health authorities will play a key role in communicating with the public with direction on specific health advice being led by medical health officers (MHOs), in conjunction with the provincial health officer (PHO). For larger scenarios, the PHO may take the lead in health communications in co-ordination with health authority MHOs. For a list of health authority resources that may be applicable in a nuclear emergency, refer to Appendix C – Summary of Radiation Resources in the B.C. Health Authorities.

5.4 PROVINCE OF B.C.

B.C.'s *All-Hazard Plan* provides a detailed description of the emergency management roles and responsibilities of provincial ministries and organizations. This section highlights key aspects of these roles with respect to management of accidental nuclear emergencies. However, given the complexity of a nuclear event, enhanced integration and flexibility may be required to ensure co-ordinated decision-making and information sharing. The Ministry of Health will work closely with the appropriate stakeholders to ensure activation of the most appropriate command and coordination structure to achieve the required effect.

5.4.1 *Ministry of Health and other Health System Organizations*

The *Public Health and Medical Services Annex* to the *All-Hazard Plan* provides a detailed description of emergency management in the provincial health system.

The Ministry of Health is designated as the key ministry for radiation spills under Schedule 1 of B.C.'s *Emergency Management Program Regulation*, and administers the ***B.C. Nuclear Emergency Plan*** (BCNEP).

Working together, the following play key roles in health-related planning with respect to accidental nuclear emergencies:

- The provincial health officer (PHO) is responsible for the planning, preparedness and response co-ordination for the public health aspects of emergencies or threats, and is the primary provincial public health spokesperson.
- The B.C. Centre for Disease Control (BCCDC) provides a wide range of support to the PHO, providing evidence based best practice knowledge on risk reduction, control of hazards and treatment regarding radiation, providing public information, and maintaining any provincial supplies of medical countermeasures. In some scenarios, the PHO may delegate lead response to the BCCDC.
- The Ministry of Health's emergency management unit ensures that the provincial health system is capable of planning for, responding to and recovering from the impacts of extreme events. The emergency management unit has a 24/7 Duty Officer program, and is responsible for the Health Emergency Coordination Centre (HECC) described in Section 6.2.4.

The BCNEP is a fully scalable plan and the Ministry of Health may take the lead in situations where components are used to address potential or minor threats, with support from federal nuclear emergency plan resources and services related to preparedness. The PHO, in co-operation with the emergency management unit or HECC, will assess the need to request to activate the provincial emergency management system. In the event of an accidental nuclear emergency involving the activation of the provincial emergency management system, the Ministry of Health will:

- Co-chair the Central Coordination Group with Emergency Management BC (EMBC) to provide strategic direction and oversight;
- Work collaboratively with EMBC to identify and activate the most appropriate provincial emergency management response structure;
- Play a key role in decisions concerning protective actions (PHO/BCCDC);
- Provide the government's public health spokesperson;
- Act as a lead liaison and co-ordinator with the provincial health sector; and
- Maintain liaison and co-ordination with Health Canada and the Public Health Agency of Canada.

5.4.2 *Emergency Management BC*

Emergency Management BC (EMBC) is housed within the Ministry of Transportation and Infrastructure and is the co-ordinating agency for all provincial emergency management activities. In response to a significant accidental nuclear emergency, EMBC will:

- Work collaboratively with the Ministry of Health to identify and activate the most appropriate provincial emergency management structure;
- Co-chair the Central Coordination Group (if convened) with the Ministry of Health to provide strategic direction and oversight;
- Co-ordinate the response with provincial ministries and agencies and local/regional authorities, including requirements for sheltering and/or evacuation of the public in affected areas – this may include the deployment of the provincial co-ordination team;
- Assist in distributing public information, advisories and warnings on behalf of the provincial health officer/Ministry of Health;
- Provide notifications to all relevant stakeholders; and
- Through the BC Coroners Service:
  - » Provide medical and legal direction with respect to the processing and disposition of any contaminated human remains;
  - » Take possession of, transport, and secure storage for any human remains;
  - » Direct and establish temporary mortuary services;
  - » Mitigate gaps for the remediation of an event with radioactive contamination;
  - » Provide security of contaminated worker(s).

5.4.3 *Ministry of Environment*

The Ministry of Environment has legislated responsibilities relating to the generation of hazardous materials, their storage and their transportation. The ministry also has legislated responsibilities that include contaminated sites and land remediation activities. In the event of a significant, off-site nuclear accident, the ministry should be notified to ensure provincial legislation compliance. The Ministry of Environment will take an active role in unified command and provide subject matter expertise as it relates to their legislation.

In addition, the ministry may provide meteorological monitoring/modelling to assist in assessing the potential dispersion of airborne materials associated with a nuclear emergency in the event that Environment Canada resources are not available.

5.4.4 *Ministry of Agriculture*

The Ministry of Agriculture is responsible for healthy and safe agri-food and seafood production and post-production processing. In the event of a significant nuclear accident, the ministry will:

- Liaise with the Canadian Food Inspection Agency, Health Canada, the Department of Fisheries and Oceans and the BC Centre for Disease Control to determine appropriate measures to be taken in the event of a nuclear emergency;
- Provide advice to farmers and aquaculturists on the protection of crops, livestock and provincially managed shellfish and marine plant stocks. Encourage adoption of agri-food and seafood practices that minimize nuclear related risks B.C. food products may pose to the public;
- Use the ministry's Farm Livestock Premise Identification System and other information to identify agri-food livestock producers potentially impacted by a nuclear incident;
- Co-ordinate the emergency relocation and care of poultry and livestock; and
- Assist the Ministry of Health with food safety.

5.4.5 *Government Communications and Public Engagement*

Government Communications and Public Engagement (GCPE) has the primary responsibility for the development of the provincial communications strategy. In the event of an accidental nuclear emergency involving the activation of the Provincial Emergency Coordination Centre, GCPE will:

- Assign a representative to the Central Coordination Group;
- Gather information from a variety of sources to inform public messages and provide briefing material;
- Liaise with colleagues in external agencies;
- Draft news releases, information bulletins, FAQs, etc. to update public; and
- Support social media channels.

5.5 FEDERAL GOVERNMENT

The roles and actions of the following federal agencies during a nuclear or radiological emergency will be co-ordinated through the Federal Nuclear Emergency Plan.

5.5.1 *Public Health Agency of Canada*

Within the federal Health Portfolio, responsibilities for emergency management activities are shared by two organizations: Health Canada and the Public Health Agency of Canada. The Health Portfolio takes action to assist provinces and territories to protect and mitigate the risks to the health of Canadians. The Health Portfolio Operations Centre is the hub for these activities. The western regional office facilitates this interaction with the B.C. Ministry of Health, commonly through a regional liaison officer assigned to the B.C. Health Emergency Coordination Centre.

5.5.2 *Health Canada*

Health Canada administers the *Federal Nuclear Emergency Plan* (FNEP), maintains the 24/7 FNEP Duty Officer program, and has the authority to modify the response level of the FNEP. In the event of a nuclear accident affecting B.C., through the leadership of Health Canada, the FNEP Technical Assessment Group will:

- Monitor trigger criteria and make decisions about FNEP response levels as described in Section 9.1 of this plan;
- Chair the FNEP Technical Assessment Group as required;
- Upon request, collaborate with the province in rapid technical assessment;
- Respond to provincial requests for FNEP resources and services as described in the B.C. Nuclear Emergency Plan and FNEP; and
- Collaborate with the province in co-ordinated, proactive and transparent public communications.

5.5.3 *Department of National Defence / Canadian Armed Forces*

The Department of National Defence/Canadian Armed Forces (DND/CAF) plays a major role in Category C events. In the event of a nuclear-powered vessel reactor emergency, DND/CAF will:

- Conduct off-site surveys;
- Assess risk to health; and
- Make recommendations on proactive measures.

5.5.4 *Public Safety Canada*

Public Safety Canada is responsible for the Government Operations Centre in Ottawa and the Federal Coordination Centre in B.C., and is responsible for overall federal co-ordination under the *Federal Emergency Response Plan* (FERP) when an emergency requires a co-ordinated Government of Canada response. In the event of a significant nuclear accident affecting B.C., Public Safety Canada will:

- Activate the Government Operations Centre and link with the Provincial Emergency Coordination Centre as required and described in the FERP and B.C. Emergency Response Management System; and
- Activate the Federal Coordination Centre and undertake the federal-regional co-ordination described in Section 5.

5.5.5 *Canadian Nuclear Safety Commission*

The Canadian Nuclear Safety Commission (CNSC) regulates the use of nuclear energy and materials in Canada. In the event of a nuclear accident involving a licensee in B.C., CNSC will:

- Monitor the response of the licensee;
- Evaluate response actions;
- Provide technical advice and regulatory approval where required; and
- Provide field response to assist local authorities as needed.

5.5.6 *Federal Summary of Responsibilities*

The *Federal Nuclear Emergency Plan* (FNEP), 5th edition, details the roles of these and other federal departments and FNEP groups. These are summarized in Table 2.

These roles and responsibilities address the FNEP nuclear emergency functions, and are co-ordinated through the FNEP Technical Assessment Group (TAG).

NUCLEAR EMERGENCY FUNCTIONS

P = PRIMARY
C = SHARED PRIMARY RESPONSIBILITY *(e.g. Scenario Driven OR Other Specific Arrangement)*
S = SUPPORTING

		AAFC	AANDC	AECL	CBSA	CFIA	CNSC	DFAIT	DFO	DND/CF	EC	HC	HRSDC	NRCan	PCO	PHAC	PS/GOC	RCMP	TC
1	**NOTIFICATION AND MONITORING**																		
1.1	Maintain a 24/7 notification and monitoring capability for FNEP arrangements.	S	S	S	S	S	S	C^	S	S	S	C	S	S	S	S	C	S	S
1.2	Host and/or set-up facilities to support the FNEP TAG and/or Task Teams.			S	S		S	C^	S	S	S	P		S		S	S		
1.3	Maintain a capability to rapidly assess all notifications and determine changes to the FNEP response level.						S	C^		S	S	P					S	S	
1.4	Maintain a capability for rapid notification and technical liaison with the International Atomic Energy Agency (IAEA), the World Health Organization (WHO) and other international organizations.				S		S	C		S		S		S		C	C		S
2	**LIAISON AND COORDINATION**																		
2.1	Maintain technical liaison and coordinate with the provincial technical teams.	S		S		S	C			S		C				S	S		
2.2	Establish and maintain technical liaison with relevant response partners.						C	S		S		C					S	C	S
2.3	Facilitate the deployment of technical and scientific resources for operations in affected areas, including federal radiological task teams for field monitoring, radiological characterization and impact assessment.						S	C^		C	S	C				C	C	S	
2.4	Assist in the management of international requests/offers for radiological/nuclear technical/scientific advice or assistance.			S			C	C		S	S	C		S		S	S	S	
3	**TECHNICAL ASSESSMENT OF RADIOLOGICAL HAZARDS AND IMPACTS**																		
3.1	Provide a capability for the assessment of actual or potential radiological hazards within Canada or the affected country, as applicable, and for the technical evaluation of countermeasures.			S	S	S	S			S/C*	S	P		S		S		S	
3.2	Gather and consolidate technical information on the emergency.			S			C	C^		S/C*	S			S		S	S		S
3.3	Characterize the source term (reactor, explosives, radiological device, radiation source, etc.), its potential evolution and the actual and potential releases of radioactive materials.			S			P			P*	S	S		S				S	
3.4	Evaluate environmental transfer of the radioactive materials within Canada, the affected country or towards Canada as applicable (e.g., atmospheric/marine transport models, ground contamination, etc.).									S*	P	S							
3.5	Evaluate actual and potential radiological impacts on health and safety, property and/or the environment and perform dose assessments where appropriate.			S			S			S	S	P						S	
3.6	Identify national and international technical/scientific resources and laboratories potentially required in support of response.	S		S		S	S		S	S		P							
3.7	Perform laboratory analysis of food, soil, air filters, etc.			S			C		S	S		C							
3.8	Propose emergency classification level (International Nuclear Event Scale) and report to the IAEA.						P			S*									
3.9	Prepare specialized products to support radiological assessment and decision-making on countermeasures.						S			S*	S	P		S			S		
4	**FIELD OPERATIONS**																		
4.1	Conduct and coordinate radiological monitoring and surveying.	S		S			S		C	S/C*		C		C			S	S	S
4.2	Support the collection and shipment of environmental, food, and or investigative samples for laboratory analysis.	S		S		C	S		C	S/C*	S	C					S	S	S
4.3	Support radiological contamination screening activities (e.g. for public, passengers or conveyances).			s			s			S		P				S		S	

* For CATEGORY C Emergencies | ^ For CATEGORY E Emergencies

NUCLEAR EMERGENCY FUNCTIONS

P = PRIMARY
C = SHARED PRIMARY RESPONSIBILITY *(e.g. Scenario Driven OR Other Specific Arrangement)*
S = SUPPORTING

		AAFC	AANDC	AECL	CBSA	CFIA	CNSC	DFAIT	DFO	DND/CF	EC	HC	HRSDC	NRCan	PCO	PHAC	PS/GOC	RCMP	TC
4.4	Assess monitoring data to verify radiological release/presence of contamination.			S			S			S		P		S				S	S
4.5	Conduct planning for decontamination activities (Provincial lead).			S			S			S		S				S	S	S	
4.6	Provide just-in-time training to field operators and/or first responders (police, fire, medical and others).			C			C			S		C		C			S		
4.7	Support FNEP TAG field operations with emergency telecommunications equipment and services.									S		P					S		
4.8	Assist in the control of food and goods imported from affected areas.				S	P													
5	**PROTECTIVE ACTION RECOMMENDATIONS**																		
5.1	Provide recommendations for protective actions in areas of federal jurisdiction or as requested by Province (for example: access control, medical treatment, sheltering, evacuation, food and water control, occupational health and safety, conveyances, imports, etc.).			S			S	S		S/C*	S	P		S		S	S		
5.2	Implement protective actions under federal jurisdiction.	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	P		S
5.3	Contribute to assessments of the actual or potential impacts of protective actions.	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	P		S
6	**PROTECTION OF EMERGENCY WORKERS**																		
6.1	Provide radiation protection advice, assistance and equipment for first responders and federal emergency workers, including provision of emergency dosimetry services.			S			S			S		P		S		S	S		S
6.2	Coordinate the implementation of occupational radiation protection programs for federal emergency workers, or in support of provinces.																		
7	**MEDICAL RESPONSE**																		
7.1	Provide training for the treatment of contaminated and/or overexposed casualties.																		
7.2	Provide or arrange for the provision of medical radiation expertise and capabilities for the treatment of contaminated and/or overexposed casualties.			S						S		S				S			
8	**INFORMING THE PUBLIC**																		
8.1	Develop technical communication products, including technical information and assessment of impacts, for the Federal-Provincial/Territorial emergency communication functions.			S			S	C^		S	S	C				S	S	S	
8.2	Assist in dissemination and customization of information products on protective actions to target specialized audiences.	S	S	S	S	S	S	C^	S	S	S	S	S	S	S	S	C	S	S
8.3	Provide SME support and spokespersons for operation of a media centre and other communication functions.	S	S	S	S	S	S	C^	S	S	S	S	S	S	S	S	C	S	S
9	**TRANSITION TO RECOVERY**																		
9.1	Contribute to developing a recovery action plan. *(Note: CNSC primary for licensed facilities, DND/CF primary for nuclear powered vessels.)*			S			P			S/P*		S		S			S		S
10	**DEACTIVATION**																		
10.1	Assist in de-escalation of the FNEP.			S			S			S	S	S					P		

* For CATEGORY C Emergencies | ^ For CATEGORY E Emergencies

5.6 FEDERAL COMMUNICATIONS

The ***Federal Emergency Response Plan*** assigns the communications co-ordination role to the director general of communications at Public Safety Canada. The co-ordination takes place through the Federal Public Communications Coordination Group, which includes representatives from all implicated federal departments (e.g., DND/CAF, Health Canada, Environment Canada, Natural Resources, etc.), the province, stakeholders, and others as required. These representatives share information from a "whole of government" perspective. The information is then transformed into communications products that are distributed to the media, the public and stakeholders.

In the case of a Category C emergency in B.C. involving a nuclear-powered vessel, DND/CAF will provide public information regarding the initial military response on-base. Following the initial response, DND/CAF communications officials in the Federal Public Communications Coordination Group will help to inform and co-ordinate the federal government's follow-up communications, in collaboration with B.C.'s Government Communications and Public Engagement and private sector stakeholders. A Federal Nuclear Emergency Plan Technical Assessment Group team will support the Federal Public Communications Coordination Group to develop or provide technical input into communications products.

For emergencies occurring at licensed facilities, the facility operator and the Canadian Nuclear Safety Commission (CNSC) will provide the Federal Public Communications Coordination Group information about on-site conditions. It is likely the operator and the CNSC would appoint their own spokespersons.

5.7 INTERNATIONAL

For nuclear emergencies in B.C. that may have trans-boundary impacts of radiological **safety significance**, the Province of B.C. is responsible for informing and co-ordinating with all its neighbouring jurisdictions, in accordance with its own plans and agreements. B.C. is a signatory of the Pacific Northwest Emergency Management Arrangement, and an active partner in the Pacific Northwest Border Health Alliance.

The federal government notifies, informs and liaises with the international community, issues requests and manages offers of assistance under international conventions and agreements. Health Canada and the Canadian Nuclear Safety Commission are the Canadian focal points for communications with the International Atomic Energy Agency. Health Canada provides the focal point for requests and offers of international assistance. The Public Health Agency of Canada is the Canadian focal point for communications with the World Health Organization and the International Health Regulations. Other federal authorities, including the Department of Foreign Affairs, Trade and Development, may also have responsibilities to communicate with their stakeholders in the international community.

6 RESPONSE STRUCTURE

The following section provides an overview of how agencies will co-ordinate the response to a nuclear emergency. The structures outlined in this section will carry out the operational elements in Section 7.

6.1 ORGANIZATIONAL CHART

Figure 6 depicts the links between emergency management structures potentially activated under the ***British Columbia Nuclear Emergency Plan***. The chart demonstrates that nuclear accidents potentially affecting B.C. range from more localized events requiring an on-site bottom-up response, to more distant and international events involving a broader top-down response

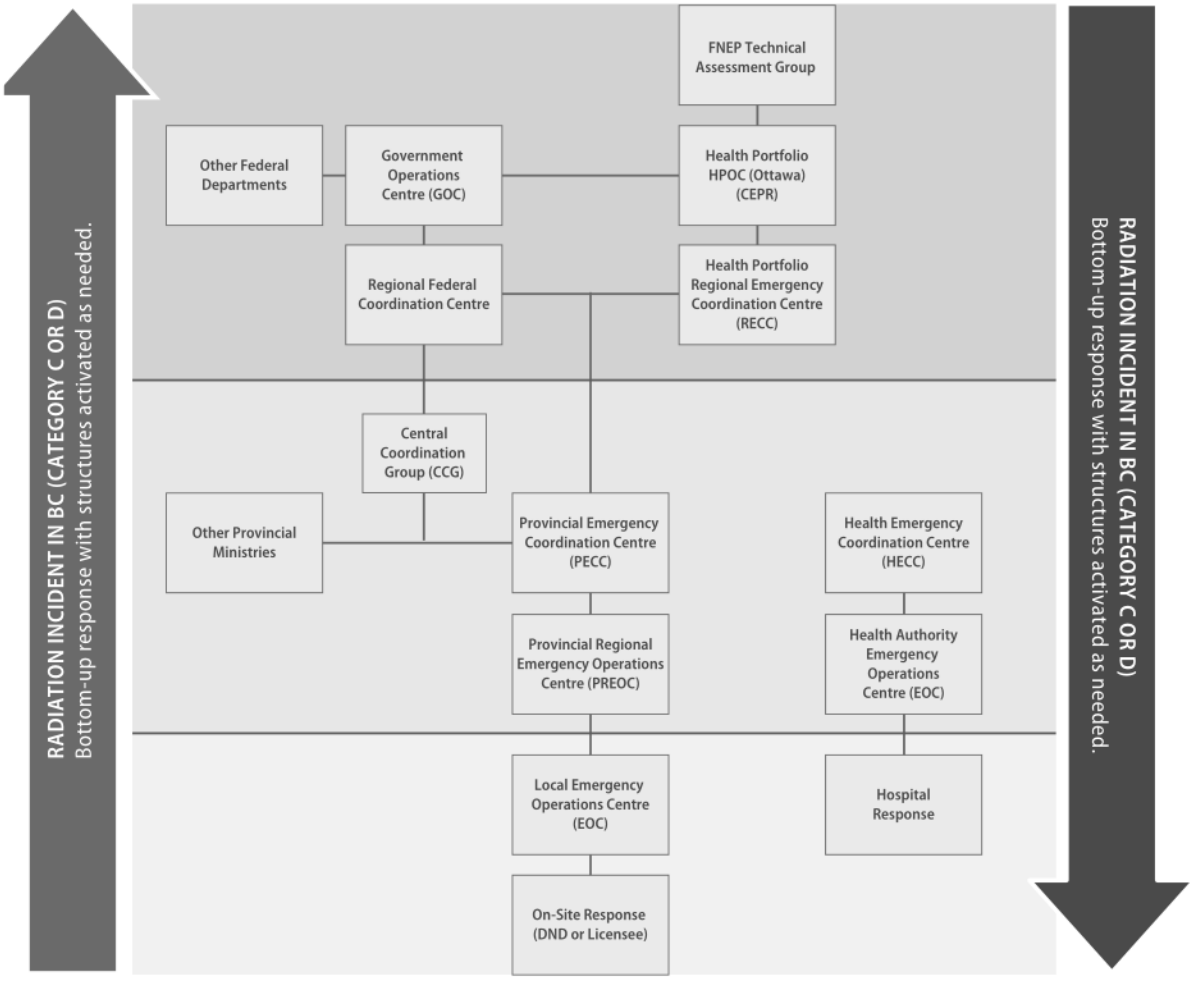


Figure 6: British Columbia Nuclear Emergency Plan Organizational Chart

6.2 KEY RESPONSE STRUCTURES/ENTITIES

6.2.1 *B.C. Emergency Management System*

All provincial government ministries, agencies and government corporations with designated responsibilities under B.C.'s *Emergency Program Management Regulation* are required to apply the policies, guiding principles and standards set out in the B.C. Emergency Management System document.

Provincial emergency policy direction is provided by a Central Coordination Group, which is composed of senior government and non-government officials selected in accordance with the nature of the emergency. In the event of a major disaster, a Minister-Deputies Emergency Committee may be convened to provide high-level policy and resource decisions concerning the response.

6.2.2 *Emergency Operations Centres*

A nuclear accident will result in the activation of an Emergency Operations Centre (EOC) by one or more of a number of potential agencies in B.C. (e.g., site operator/licensee, fire services, BC Emergency Health Services, local authority, regional health authority, provincial ministries, and/or DND/CAF) in the case of an event involving a nuclear powered vessel. The role of an EOC is to co-ordinate the agency's response.

B.C. Emergency Management System standards are recommended best practices for all agency EOCs in B.C., to provide for maximum inter-operability within the overall provincial emergency management system.

6.2.3 *Provincial Regional Emergency Operations Centre/ Provincial Emergency Coordination Centre*

Emergency Management BC incorporates six regional offices, each with a Provincial Regional Emergency Operations Centre (PREOC). PREOCs are responsible for the provision and co-ordination of provincial support for local authorities and First Nations within designated regional boundaries. PREOCs receive situation reports and resource requests from local authority Emergency Operation Centres.

The Provincial Emergency Coordination Centre (PECC), located in Greater Victoria, is responsible for the overall co-ordination of an integrated provincial response. Upon activation, the PECC and Health Emergency Coordination Centre work closely, via liaison and regular communication, to ensure an integrated response.

6.2.4 *Health Emergency Coordination Centre*

The Ministry of Health's emergency management unit operates a 24/7 Duty Officer program and houses the Health Emergency Coordination Centre (HECC), which can be activated to provide policy direction and support to the health authorities and other health agencies. In a nuclear emergency, the HECC serves as the health system's co-ordination and communications link with Emergency Management BC and the rest of the provincial emergency management structure, including Health Canada and the Public Health Agency of Canada.

6.2.5 *Federal Nuclear Emergency Plan Technical Assessment Group*

The Federal Nuclear Emergency Plan Technical Assessment Group (FNEP TAG) is a multi-departmental group composed of scientific/technical experts from designated FNEP partner organizations, and is chaired by the director of the Radiation Protection Bureau in Health Canada. The FNEP TAG is responsible for gathering data, conducting assessments and recommending and/or implementing appropriate actions for the management and mitigation of off-site radiological consequences.

Section 9.3 describes the FNEP TAG supports available to B.C., upon request, and the federal/provincial accountabilities and co-ordination involved in collaborative technical assessments under the FNEP.

Federal Radiological Task Teams of subject matter experts may be deployed to the site of a nuclear emergency when specialized equipment and/or expertise are required for radiological monitoring and assessment. For an event within the scope of FNEP, Federal Radiological Task Teams will operate under the authority of their home organizations, but under the overall direction of the officials of FNEP Technical Assessment Group and the provincial/territorial emergency management system. Activities may include environmental monitoring, sample collection, population screening and provision of resources for emergency workers.

6.2.6 *Federal Nuclear Emergency Plan Designated Officials and Response Teams*

The full list of Federal Nuclear Emergency Plan (FNEP) designated officials can be obtained from the FNEP, 5th edition, and includes the following:

FNEP Designated Officials: The designated official is a first point of contact for stakeholders on FNEP-related issues. The designated official can be contacted on a 24/7 basis, and serves to triage incoming information on incidents and events. The designated official maintains a log of all calls, actions, decisions and events, and notifies Health Canada management when there are events that could require a FNEP response. Any decision to take further action rests with Health Canada, in consultation with provincial/territorial and other FNEP partner organizations as appropriate.

FNEP Technical Liaison Officers: Technical liaison officers can be deployed to serve as the link between the FNEP Technical Assessment Group and other internal and external stakeholders, including federal and provincial/territorial operations centres and internal organizations as required.

FNEP Technical Regional Officer: The regional officer is a regional senior official designated by Health Canada. This position will normally be staffed by Health Canada's regional director general delegate. The regional officer works with the Public Health Agency of Canada regional director and regional co-ordinator for Emergency Preparedness and Response, the Public Safety regional director, other federal-regional executives (as appropriate) and the FNEP liaison officers to co-ordinate federal radiological consequence management support to federal-regional and provincial/territorial response activities.

FNEP Spokesperson: The spokesperson, designated by the Federal Emergency Response Management System Senior/Executive Group, shall co-ordinate activities with the Federal Public Communications Coordination Group in the Government Operations Centre and with provincial/territorial communications officials.

7 OPERATIONAL ELEMENTS

7.1 TECHNICAL ASSESSMENT

Technical assessment in this context refers to the collection and analysis of all available information to assess the risks resulting from a nuclear accident. The responsibility for the assessment will differ depending on the category of the event.

The provincial health officer (PHO) and BCCDC will normally lead this process at the provincial level. If the Provincial Emergency Coordination Centre is activated, the PHO/BCCDC will link through the Health Emergency Coordination Centre (HECC) to work with the Federal Nuclear Emergency Plan (FNEP) Technical Assessment Group in collaboration with the Technical Specialists Team in the HECC Planning Section to undertake technical assessments. The Department of National Defence/Canadian Armed Forces will lead the on-base technical assessment in the event of an accident involving a nuclear powered vessel, and collaborate with local authorities and the province in conducting off-base technical assessments. Section 9.3 describes the FNEP Technical Assessment Group supports available to B.C., upon request, and the federal/provincial accountabilities and co-ordination involved in collaborative technical assessments under the FNEP.

7.2 RISK COMMUNICATIONS

The history and symbolism involved in the public's perception of radiation mean that perceived risk often exceeds scientific risk (Slovic, 2012). B.C.'s experience with low assessed risks but high levels of public concern following the 2011 incident at the Fukushima nuclear power plant in Japan, demonstrated the importance of risk communication. In the event of a significant nuclear accident in B.C., principled and sound risk communication will be critical in terms of managing the implementation of protective actions like sheltering in place, and minimizing psychological stress. There will be a need to keep the public informed with available, confirmed information and provide regular updates as data is being gathered and verified.

Appendix E provides a summary from the International Atomic Energy Agency concerning the common communication errors made in the assessment of radiological health hazards following an incident

7.2.1 *Principles*

The following principles of communication will guide the response to an accidental nuclear emergency affecting British Columbia. The principles apply to all components of communication, including data gathering and analysis and information sharing.

- Appetite for information is not directly proportional to the actual risk level but is related to the perceived level of risk;
- Data needs to be gathered as quickly as possible following notification of a nuclear emergency;
- Information needs to be translated into language appropriate for the lay person/general public;
- Raw data, wherever possible, should be made available to anyone asking for it, including the public. Data should be easily accessible in the interests of transparency and good faith; and
- Responsibilities to reassure, inform, and protect the public should be acknowledged and form the basis for open information sharing between all levels of government.

7.2.2 *Informing the Public*

Ensuring co-ordinated, proactive and transparent public communications is a key feature of the ***B.C. Nuclear Emergency Plan***. All public communications from the B.C. Government will be co-ordinated through Government Communications and Public Engagement, which will develop the provincial communications strategy in cooperation with the provincial health officer (PHO), B.C. Centre for Disease Control, federal communications officials, and subject matter experts from the Federal Nuclear Emergency Plan Technical Assessment Group. If the Provincial Emergency Coordination Centre (PECC) is activated, this group will operate as the Information Officers Team (likely virtual) in the B.C. Emergency Management System structure, supported by the Technical Specialists Team in the Planning Section. The PHO is the primary public health spokesperson.

In the event of an accident involving a nuclear-powered vessel, the Department of National Defence/Canadian Armed Forces in conjunction with the PECC will activate a Joint Information Bureau to co-ordinate public communication.

7.3 ENVIRONMENTAL MONITORING

As described in Section 3, environmental monitoring would be a key response activity in a number of scenarios potentially affecting British Columbia. Section 4.1 describes the capabilities that exist in B.C. to support ongoing environmental monitoring. In the event of a nuclear accident, it will be important to augment these capabilities by drawing on other resources that might be accessed through the B.C. Centre for Disease Control, Ministry of Environment and/or the private sector in British Columbia.

Monitoring following an incident would involve testing of:

- Air and soil to track any radioactive plumes and identify hot spots; and
- Drinking water, milk, seafood and other foods and beverages, to support the implementation of restrictions as a protective action.

Section 9.5 describes the federal field resources that could be requested to support environmental monitoring.

7.4 WORKER PROTECTION

In the event that licensees and/or first responders are deployed to respond at the site of a nuclear emergency, radiation exposure to all emergency workers should be kept as low as reasonably achievable. Employers should ensure that emergency workers have and are trained in the use of appropriate personal protective equipment (PPE).

B.C.'s *Occupational Health and Safety Regulation* contains legal requirements that must be met by all workplaces in the province. ***Part 7, Division 3*** of the regulation and the accompanying guidelines define requirements concerning radiation exposure including standards concerning control measures and the use of PPE. Refer to Appendix F for Canadian Nuclear Safety Commission recommended turn-back and permissible doses.

7.5 COUNTERMEASURES/ PROTECTIVE ACTIONS

Urgent decisions regarding off-site countermeasures or protective actions will be made by first responders and local authorities and must be in consultation with the health sector as per the ***Public Health Act*** (e.g., local medical health officer, provincial health officer, BCCDC). British Columbia follows the current Health Canada recommendations concerning countermeasures described in Table 3.

COUNTERMEASURE	DEFINITION	DOSE AVERTED
SHELTERING	A directive to remain indoors with closed doors and windows, with ventilations systems shut off, for a few hours to two days	5 mSv in 1 day
EVACUATION	In this context, the displacement of the population, or part of the population, from an area which has been, or may become contaminated with radioactive substances	50 mSv in 7 days
RELOCATION	Displacement of the population from a contaminated area for a period of several weeks, months or even over a year	50 mSv/year
STABLE IODINE PROPHYLAXIS	Taking potassium iodide orally when outdoor air is expected to contain significant amounts of radioactive iodine, to block the absorption of radioactive iodine by the thyroid gland	100 mSv committed equivalent dose
FOOD CONTROL	Restrictions on the sale of radioactively contaminated food	1 mSv per food group

TABLE 4: *Health Canada recommendations concerning countermeasures (2003)*

7.6 MEDICAL RESPONSE

Health emergency plans address the need to treat patients needing urgent care. Treatment of life-threatening illness and injury take precedence over decontamination and radiological assessment.

Each health authority in B.C. has a Patient Decontamination program that can be activated to provide patient triage and care. Information sources such as the Oak Ridge Institute for Science and Education's *Radiation Emergency Assistance Center/ Training Site (REAC/TS)* are available online to support medical teams in planning and preparing to respond to a radiation casualty.

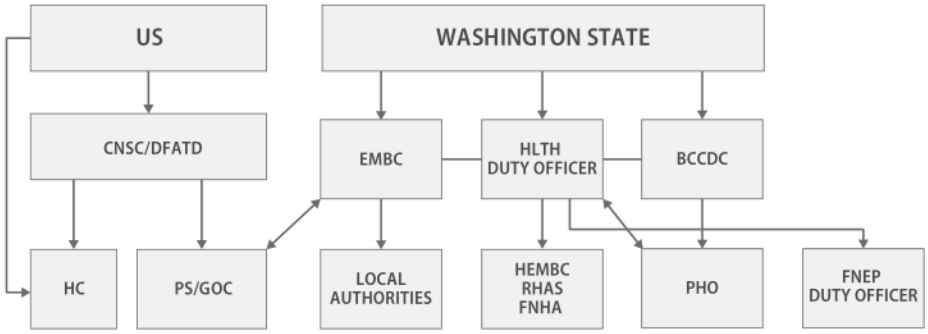
7.7 DE-ESCALATION AND THE TRANSITION TO RECOVERY

Co-ordinated by the Ministry of Health, the transition to recovery will include:

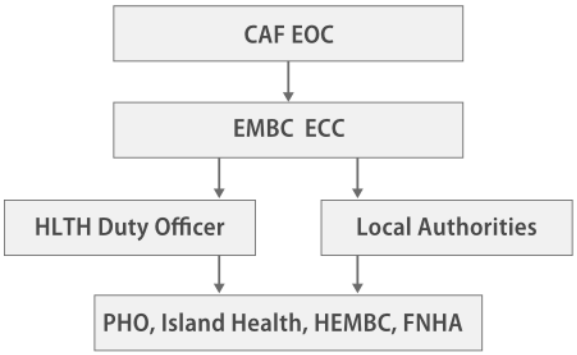
- Establishing a recovery management plan with reference levels on residual dose from long-term contamination and strategies for restoration of normal socio-economic activities;
- Monitoring of contaminated areas, assessment of potential doses to public and workers;
- Assessment of medium and long-term health hazards;
- Environmental decontamination and radioactive waste disposal operations; and
- Maintenance of dose registries for emergency workers.

8 RESPONSE PROTOCOLS

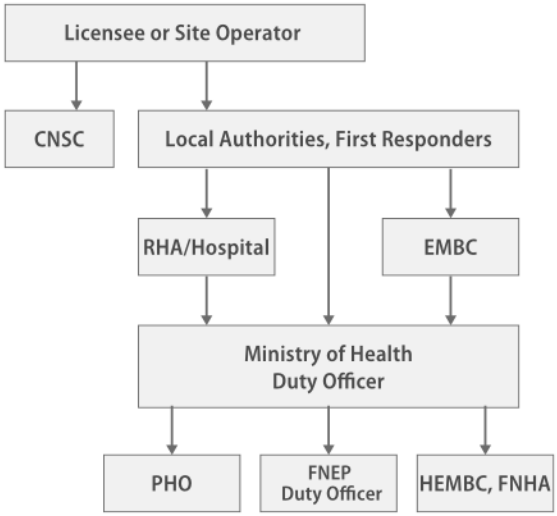
The following tables provide an overview of initial notifications, lead agencies and key actions that would take place during the types of nuclear accidents that could require a ***B.C. Nuclear Emergency Plan*** activation. Section 4 provides more detail about organizational roles.

CATEGORY B: A SIGNIFICANT RELEASE OF RADIOACTIVE MATERIAL FROM THE NUCLEAR POWER PLANT IN WASHINGTON STATE	
NOTIFICATION TO PROVINCIAL, LOCAL AND REGIONAL AGENCIES	
LEAD AGENCIES	DFATD LEADS INTERNATIONAL RESPONSE EMBC AND HLTH CO-ORDINATE PROVINCIAL RESPONSE
KEY ACTIONS	▸ BCNEP, provincial co-ordination activated ▸ EMBC and HLTH co-lead the CCG ▸ PHO, BCCDC and the FNEP TAG form the Technical Specialists Team in the PECC Planning Section and undertake rapid technical assessment and make recommendations concerning protective actions, e.g. food and water, restriction of contaminated items (see Section 5.4 Countermeasures/ Protective Actions). ▸ B.C./WA information sharing and collaboration takes place between established Pacific Northwest Emergency Management Arrangement and Pacific North West Border Health Alliance partners ▸ Potential deployment of the Provincial Coordination Team ▸ EMBC supports local authorities and co-ordinates across multiple ministries ▸ HLTH co-ordinates the health response, supports health authorities ▸ GCPE leads the formation of the information officer function in the PECC and supports the PHO in risk communication ▸ Province undertakes longer-term monitoring of air, impacts to agriculture and drinking water, as necessary, supported by FNEP resources

CATEGORY C: BASE ALERT, BASE EMERGENCY OR GENERAL EMERGENCY INVOLVING A NUCLEAR-POWERED VESSEL IN B.C.

NOTIFICATION TO PROVINCIAL, LOCAL AND REGIONAL AGENCIES	
LEAD AGENCIES	DND/CAF LEADS ALL ON-BASE ACTIVITIES LOCAL AUTHORITIES LEAD OFF-BASE RESPONSE
KEY ACTIONS	▸ DND/CAF undertakes all on-base technical assessments, response and decontamination activities ▸ Local fire and BC Emergency Health Services conduct off-base first response ▸ PHO/BCCDC, Island Health and FNEP TAG form the Technical Specialists Team in the PECC Planning Section to undertake technical assessment and recommend protective actions to local authorities. DND/CAF would be virtual for the first 24-48 hours ▸ DND/CAF would conduct off-site ambient gamma radiation survey ▸ Local authorities undertake protective actions, supported by EMBC and HLTH ▸ Island Health undertakes health and medical response, supported by HLTH PHO ▸ DND/CAF, PHO/BCCDC, EMBC, GCPE, local authorities and Island Health co-ordinate public communications through the Joint Information Bureau and the Information Officers Team in the PECC ▸ EMBC supports local authorities and co-ordinates across multiple ministries ▸ HLTH co-ordinates the health response, supports Island Health ▸ Province undertakes longer-term environmental monitoring as necessary, supported by federal government

CATEGORY D: NUCLEAR ACCIDENT INVOLVING A RESEARCH REACTOR, OTHER LICENSEE OR TRANSPORTATION OF RADIOACTIVE MATERIAL IN B.C.

NOTIFICATION TO PROVINCIAL, LOCAL AND REGIONAL AGENCIES	
LEAD AGENCIES	LICENSEE LEADS ON-SITE RESPONSE FIRST RESPONDERS AND LOCAL AUTHORITY LEAD OFF-SITE RESPONSE
KEY ACTIONS	▸ If limited to on-site, licensee notifies, responds and monitors ▸ If there are off-site implications, fire and ambulance undertake decontamination and transport ▸ Local authority activates its emergency response plan ▸ Health authority/designated hospital activate emergency plans and receive any casualties ▸ EMBC supports local authority and co-ordinates across multiple ministries ▸ HLTH supports health authority and co-ordinates health system response ▸ BCNEP, PECC and/or PREOC and HECC are activated, EMBC and HLTH co-lead the CCG ▸ PHO, BCCDC and the FNEP TAG form the Technical Specialists Team in the PECC Planning Section and undertake rapid technical assessment and make recommendations concerning protective actions, e.g. food and water, restriction of contaminated items (see Section 5.5 Countermeasures/ Protective Actions). ▸ GCPE leads the formation of the information officer function in the PECC and supports the PHO in risk communication ▸ Province undertakes longer-term environmental monitoring as necessary, supported by federal resources

9 FEDERAL/PROVINCIAL ACCOUNTABILITIES *and* CO-ORDINATION

This section describes key aspects of federal/provincial accountabilities and co-ordination concerning the management of nuclear accidents in British Columbia.

9.1 BCNEP/FNEP RESPONSE LEVELS AND TRIGGER CRITERIA

The British Columbia Emergency Management System and the ***B.C. Nuclear Emergency Plan*** (BCNEP) have three response levels: 1. Minimum; 2. Mid-Level; and 3. Full.

The *Federal Nuclear Emergency Plan* (FNEP) also has three heightened response levels, ranging from enhanced monitoring activities through to a full-scale technical response. A complete description of the FNEP response levels can be found in the FNEP, 5th edition.

Subject to the specific circumstances of the emergency, the trigger to raise the response level of the FNEP and establish the FNEP Technical Assessment Group may be made prior to, concurrently with or following decisions under the BCNEP or Federal Emergency Response Plan response level (for example, in the case of concurrent emergencies, emergencies abroad, or situations that have started as a non-nuclear emergency). Table 4 describes BCNEP and FNEP response levels and trigger criteria.

BCEMS/BCNEP RESPONSE LEVELS	BCEMS/BCNEP ACTIVATION DETAILS	FNEP RESPONSE
ROUTINE MONITORING		FNEP REMAINS AT ROUTINE MONITORING
LEVEL 1: MINIMUM *Single event which is over quickly and requires only past event response and recovery activities.*	▸ Most accidents are handled by on-site, on-scene or first responders, and may involve a hospital response by a regional health authority ▸ HLTH/PHO may lead provincial co-ordination/response if a potential or minor threat does not reach the threshold of an emergency ▸ May involve limited activation of PREOC(s) or the PECC	▸ FNEP Response raised to Enhanced Reporting (Level 1)
LEVEL 2: MID-LEVEL *Major or multiple events. Two or more community, ministry or agency Emergency Operation Centres activated.*	▸ Provincial emergency management structure is activated and functional positions are staffed as required ▸ CCG activated ▸ M-DEC activated if deemed necessary	▸ FNEP Response raised to Assessment and Planning (Level 2) ▸ FNEP TAG and liaison staff link virtually with the PECC ▸ Some FNEP scientific/technical capabilities may be implemented for situation assessment as required
LEVEL 3: FULL *A major emergency or multiple events that impact a number of regions and multiple jurisdictions.*	▸ Provincial emergency management structure is activated and fully staffed ▸ CCG and M-DEC activated.	▸ FNEP Response raised to Co-ordinated Response (Level 3) ▸ FNEP liaison staff are deployed to the PECC ▸ FNEP TAG members mobilized to an emergency operations centre, and other staging locations as appropriate. ▸ All appropriate FNEP TAG functional groups are fully activated, linked at least virtually with the PECC, made ready for deployment, or deployed as appropriate

Table 5: FNEP-based responses to BCNEP triggers

9.2 FEDERAL/PROVINCIAL NOTIFICATIONS

9.2.1 *Initial Notifications*

Early information about emergencies can come from multiple sources, including official channels and the media. The following describes formal federal/provincial notifications:

- CATEGORY A: ***An emergency at a nuclear power plant in Canada:*** B.C. does not have a nuclear power plant. Emergency Management BC (EMBC) will be included when the Government Operations Centre notifies provinces/territories.
- CATEGORY B: ***An emergency at a nuclear power plant or research reactor in the U.S. or Mexico:*** Department of Foreign Affairs, Trade and Development, Health Canada, Canadian Nuclear Safety Commission or Public Safety Canada/Government Operations Centre will normally be the first government agencies to receive the initial report. They, in turn, will notify the provinces and territories.
- CATEGORY C: ***An emergency involving a nuclear-powered vessel in B.C.:*** The Department of National Defence/Canadian Armed Forces will notify Public Safety Canada, Federal Nuclear Emergency Plan duty officer and EMBC.
- CATEGORY D: ***Other nuclear emergencies or potential threats in North America:*** For nuclear accidents in B.C. with off-site implications, EMBC or Ministry of Health designated official will be notified by first responders and/or local or regional authorities, and will notify the Federal Nuclear Emergency Plan (FNEP) designated official. If the emergency is in another province or elsewhere in North America, Health Canada will receive direct notification from the Government Operations Centre, the International Atomic Energy Agency (IAEA) or other partners, and will notify other provinces/territories.
- CATEGORY E: ***A nuclear emergency outside North America:*** Health Canada will receive formal notification from IAEA, and will notify federal FNEP partners and provinces/territories.

9.2.2 *Subsequent Federal Notifications and Fan-out*

- Based on its assessment of the information, Health Canada, in consultation with appropriate Federal Nuclear Emergency Plan (FNEP) partners, will adopt a FNEP response level commensurate with the risk assessment and B.C.'s response level (see Table 4) and notify federal FNEP partners accordingly. Public Safety Canada /Government Operations Centre will handle all other federal notifications and activations under the *Federal Emergency Response Plan*.

9.2.3 *International Notifications*

The Government of Canada is expected, by international conventions, to notify international partners in the event of a nuclear emergency that affects public health or that may have radiological impacts beyond Canadian borders. Details concerning these notifications can be found in the *Federal Nuclear Emergency Plan* (5th edition).

9.3 COLLABORATIVE TECHNICAL ASSESSMENT

Federal support to B.C. under the ***Federal Nuclear Emergency Plan*** for technical assessment of radiological impacts may include monitoring and assessing the nuclear emergency situation, providing information on its possible evolution and potential impacts, preparing specialised decision-support and geomatic products, formulating protective action recommendations for the radiological protection of emergency workers, public and environment as required, preparing technical communications products, undertaking lab-based and field monitoring and assessment activities at the request of the province, supporting human monitoring activities and ensuring technical liaison with relevant counterparts. These support activities will be co-ordinated through the Federal Nuclear Energy Plan Technical Assessment Group (FNEP TAG).

The FNEP TAG will obtain information from all relevant sources, including: pre-existing data-sharing arrangements with provinces; FNEP partners; radiological monitoring networks; any deployed federal assets; federal government institutions with specialized expertise in areas relevant to the technical assessment; other countries; and/or the International Atomic Energy Agency and other international organizations. In addition to providing this information in support of B.C., the FNEP TAG will focus on assessing the impacts of the emergency on Canadian jurisdictions outside of B.C. and in neighbouring countries.

B.C. will in turn provide the FNEP TAG with all relevant on-site and off-site information it has available and results of its modeling and technical assessments. Any discrepancies will only be communicated to the technical authorities involved for joint resolution.

9.4 FEDERAL FIELD OPERATIONS IN SUPPORT OF B.C.

For nuclear emergencies in B.C., or those having direct impact on B.C., monitoring of radiation in the environment and sampling of agricultural products, food, soil, water, etc. will normally be co-ordinated by the Province, with federal resources and support as appropriate.

Provincial and federal radiological monitoring networks and real-time radiation detection systems, including the Canadian Radiological Monitoring Network and the Fixed Point Surveillance Network, will be used to monitor the environment for radiological contamination in order to provide information about the radioactive source, assess the risk to health and formulate protective action recommendations. In areas of federal jurisdiction or at the request of the Province, additional federal field capabilities may be deployed to assist and support B.C. field operations and radiological monitoring and sampling.

The main asset to obtain information about the radioactive source will be the DND Nuclear Emergency Response survey vehicles and boats, which would conduct surveys off-site. The team will assess the risk to health and make recommendations on protective actions. Federal support to B.C. for monitoring the environment, imports, and travellers from other affected areas will be co-ordinated by the Federal Nuclear Emergency Plan Technical Assessment Group (FNEP TAG) in collaboration with the Government Operations Centre operations, planning and logistics functions. International deployment of personnel and/or equipment will be undertaken through bi-lateral or multi-lateral arrangements and co-ordinated primarily through Department of Foreign Affairs, Trade and Development.

All processed data collected by federal monitoring and sampling capabilities will be provided directly to the FNEP TAG and shared with the Ministry of Health or Provincial Emergency Coordination Centre (if activated) through a secure electronic platform.

9.5 FEDERAL/PROVINCIAL LIAISON AND CO-ORDINATION

9.5.1 *International Co-ordination*

Communications with the international community and requests and/or offers of technical/scientific assistance co-ordinated through the International Atomic Energy Agency (IAEA) will be conducted by Health Canada, the Canadian Nuclear Safety Commission, the Government Operations Centre and the Department of Foreign Affairs, Trade and Development (DFATD) as the Canadian focal points in accordance with the ***Convention on Early Notification of a Nuclear Accident*** (IAEA, 1989), ***Operations Manual for Incident and Emergency Communications (***IAEA, 2012), ***Convention on Assistance in Case of a Nuclear Accident or Radiological Emergency*** (IAEA, 1999a) and the ***IAEA Response and Assistance Network – RANET*** (IAEA 2013). Communications with the World Health Organization will be conducted by the Public Health Agency of Canada in accordance with the provisions of the International Health Regulations and relevant supporting documents. Communications with the World Meteorological Organization will be managed by Environment Canada in accordance with the relevant technical communications procedures. Technical communications with the international community will be co-ordinated through the Government Operations Centre and the Federal Nuclear Emergency Plan Technical Assessment Group (FNEP TAG), and will be in accordance with the advice, procedures and assistance of DFATD. Any co-ordination between international organizations in support of B.C. will be undertaken within the framework of the ***Joint Radiation Emergency Management Plan of the International Organizations*** (IAEA, 2010).

In co-ordination with the IAEA, technical liaison and assessment teams may also be dispatched from the IAEA to assist with the assessment of an event in British Columbia. Such teams will be co-ordinated through DFATD and work in collaboration with the FNEP TAG and Provincial Emergency Coordination Centre (PECC).

The PECC and the FNEP TAG will be informed of technical/scientific information exchanged with United States and international authorities. B.C. is a signatory of the Pacific Northwest Emergency Management Arrangement, and an active partner in the Pacific Northwest Border Health Alliance. During a nuclear emergency, the Ministry of Health or PECC (if activated) will inform the Government Operations Centre and DFATD of consultations with their United States counterparts. Consultations, commitments, or decisions taken among organizations in direct contact will not exceed the scope of the relevant agreement(s) and will be co-ordinated with the appropriate Canadian authorities.

9.5.2 *National Co-ordination*

In accordance with the Federal Emergency Response Plan, Public Safety Canada/Government Operations Centre, with the support of federal organizations involved in the *Federal Nuclear Emergency Plan*, develops the overall inter-departmental strategy for federal operations and co-ordinates the overall federal response including the provision of federal resources to provinces and territories. The Federal Nuclear Emergency Plan Technical Assessment Group (FNEP TAG) is responsible for co-ordinating and mobilizing the federal scientific/technical support to the Province in accordance with pre-established arrangements described herein and/or deliberations between the FNEP TAG and the Provincial Emergency Coordination Centre during the emergency.

9.5.3 *Federal-Regional Co-ordination*

When an emergency in B.C. requires an integrated Government of Canada response, the Public Safety Canada regional director co-ordinates the response on behalf of federal departments and agencies in the region. The regional director acts as the interface between the federal government and the Province of B.C. emergency management organizations, and co-ordinates requests and responses for emergency management assistance. The regional director provides appropriate representation in the Provincial Emergency Coordination Centre as required, at the request of the Province of British Columbia.

9.5.3.1 REGIONAL HEALTH PORTFOLIO

Health Canada and the Public Health Agency of Canada B.C.-regional offices are represented by a regional director general (RDG) and a regional director (RD), respectively, during an emergency. The B.C.-regional RDG and RD promote national consistency in the Health Portfolio's emergency management activities in B.C. and facilitate co-ordination, co-operation and partnering among federal departments, provincial and territorial levels of government, non-governmental organizations and the private sector. They also provide advice and direction to line managers and co-ordinate the interests of the Health Portfolio during a major regional emergency involving the health sector.

Under most circumstances, the Public Health Agency of Canada's RD is responsible for the overall co-ordination of the regional Health Portfolio emergency management activities. During a nuclear event, however, the RDG of Health Canada's B.C. Region becomes the lead for the co-ordination of regional emergency management activities, in close co-ordination with other regional Health Portfolio emergency management program areas. For events that require national Health Portfolio co-ordination, the B.C.-regional Health Portfolio will provide local co-ordination in support of the national response. When federal support is needed for B.C. response activities, the Health Portfolio regional offices will activate their Regional Emergency Coordination Centre and will respond to the emergency, communicating and co-ordinating with the Health Portfolio Operations Centre in Ottawa as required. Health Portfolio liaison staff sent to the Provincial Emergency Coordination Centre (PECC) in support of a full PECC activation under the B.C. Nuclear Emergency Plan will report their activities through the Regional Emergency Coordination Centres.

9.5.3.2 HEALTH PORTFOLIO EMERGENCY PREPAREDNESS AND RESPONSE CO-ORDINATOR

The Health Portfolio regional emergency preparedness and response (EPR) co-ordinator leads and co-ordinates the overall emergency preparedness and response activities across the regional Health Portfolio. The EPR co-ordinator fosters collaboration between Health Canada and the Public Health Agency of Canada to enhance regional EPR capacity through the development of response plans, policies, procedures, models and interdepartmental collaborations.

9.5.3.3 FEDERAL-REGIONAL EMERGENCY MANAGEMENT STRUCTURE

The Federal Coordination Steering Committee (FCSC) is a committee composed of senior regional federal government institution representatives that is co-chaired by the Public Safety Canada regional director and the senior representative of the primary federal department in the region. The committee provides direction on emergency management planning and preparedness activities in the region, and oversees the co-ordination of the federal-regional response through the **Federal Coordination Centre**. The B.C. Health Canada regional director general and the Public Health Agency of Canada regional director are standing members of the FCSC.

9.5.4 *Federal- Provincial Co-ordination – Other Provinces and Territories*

Some nuclear emergencies may have trans-boundary consequences. For those events that occur inside the Province of B.C., but are likely to affect populations outside of B.C., designated Federal Nuclear Emergency Plan (FNEP) Technical Assessment Group representatives will liaise with the province/territory that is directly affected and also with the Province of British Columbia. Co-ordination between the federal-provincial emergency response organizations for other provinces and territories will be conducted according to the arrangements described in the *Federal Emergency Response Plan* and National Emergency Response System, augmented by provisions in the FNEP and annexes, and in accordance with respective provincial/territorial nuclear emergency response plans. Requests for federal assistance and resources from the province or territory that is most directly affected by the emergency shall be given priority consideration over requests from more distant jurisdictions.

9.6 FEDERAL COMMUNICATIONS

At the federal level, the Federal Public Communications Coordination Group, led by Public Safety Canada's Communications Directorate, will co-ordinate the federal government's communications response to the public, media and affected stakeholders in collaboration with Government Communications and Public Engagement and private sector stakeholders as required. For Category C emergencies involving a nuclear-powered vessel, the Department of National Defence/Canadian Armed Forces will be the lead agency for public information regarding the initial military response on-base. For emergencies occurring at licensed facilities, the facility operator and the Canadian Nuclear Safety Commission (CNSC) will provide information about on-site conditions. The operator and the CNSC will likely appoint their own spokespersons.

To support the activities of the federal communications group in informing the public, media, workers, etc., a Federal Nuclear Emergency Plan Technical Assessment Group (FNEP TAG) task team will be established to develop or provide technical input into communications products.

9.7 FEDERAL SUPPORT CONCERNING COUNTERMEASURES

Upon request, federal authorities will support B.C. actions through the rapid exchange of technical assessment information and will develop its recommendations based on provincial, federal and international guidance.

As required and requested, the FNEP TAG may provide recommendations and co-ordinate the provision and use of specialized equipment (such as radiation **dosimeters**) to help protect federal and other emergency workers where potential exposure to radiation may occur. Where dose limits and other response criteria do not already exist, the FNEP TAG may provide radiation protection advice in accordance with relevant regulations or guidelines.

In the event that federal decisions on protective actions are required for areas under federal jurisdiction (e.g., on a DND/CAF base), their implementation will be carried out in a manner consistent with local and provincial response activities.

The Health Portfolio maintains limited supplies of medical countermeasures for internal radiological contamination in the National Emergency Strategic Stockpile.1 Upon request, these supplies can be made available; in most cases within a 24 hour period, to provincial authorities for use in their response to a nuclear emergency. The federal government may also assist the Province of B.C.

1 Examples of medical countermeasures in Public Health Agency of Canada's National Emergency Strategic Stockpile include limited quantities of Prussian Blue, Ca- and Zn-DTPA, and potassium iodide (KI).

by providing training and guidelines in support of their preparedness activities. Details on training programs and session can be found in Appendix F.

For emergencies occurring outside of Canada, the FNEP TAG will monitor the advice given by authorities in the country of the emergency. Based on this information, as well as its own technical assessments, the FNEP TAG will formulate recommendations for appropriate protective action for Canadians in affected countries, as well as for travel and trade. Such recommendations will be shared with Province of B.C. authorities through established federal, provincial-and territorial mechanisms.

9.8 FEDERAL SUPPORT FOR DE-ESCALATION AND RECOVERY

Federal authorities, including the Federal Nuclear Emergency Plan Technical Assessment Group, may have a role to play in supporting B.C. in the activities described in 7.7. If applicable, this could include implementation and administration of federal post-disaster financial assistance programs under the ***Nuclear Liability Act (1985).***

9.9 FNEP RESOURCES AND SERVICES

In accordance with the federal *Emergency Management Act*, Section 9(3), the ***B.C. Nuclear Emergency Plan*** (BCNEP) as the *Federal Nuclear Emergency Plan* (FNEP) B.C. Annex constitutes a pre-existing arrangement with the Province of B.C. to provide specific assistance (technical/scientific or operational) during an emergency. As such, it may be enacted to provide the technical/scientific and operational resources described in the B.C. annex and the FNEP to support the Province of B.C. including resources and assets to aid in the overall preparedness and **response phases** of a nuclear emergency. Appendix F provides details of FNEP resources and services. The scope and nature of the emergency will dictate the level of resources available in keeping with priorities established by the BCNEP, *Federal Emergency Response Plan* and the FNEP.

9.9.1 *Requesting FNEP Resources*

Requests for FNEP resources should be directed to the FNEP designated official or the Technical Assessment Group chair if the Provincial Emergency Coordination Centre is activated.

A APPENDIX A | *Bibliography*

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B APPENDIX B | *Glossary*

Access control: The process of restricting access into the affected zone to emergency workers and other permitted individuals only.

As Low as Reasonably Achievable: An optimization tool in radiation protection used to keep individual, workplace and public dose limits as low as reasonably achievable (ALARA), social and economic factors being taken into account. ALARA is not a dose limit. It is a practice that aims to keep dose levels as far as possible below regulatory limits.

Base Alert: Emergency level adopted when an abnormal situation, with no immediate radiological threat, could deteriorate into a nuclear emergency.

Base Emergency: Emergency response level adopted when there is a confined nuclear emergency or a significant risk of a confined nuclear emergency with no imminent threat or radiological release to the environment.

Ca- and Zn-DTPA (diethylenetriamine pentaacetate acid) (Drugs used to increase elimination of radioactive plutonium, americium, californium, curium, cobalt, zirconium, nickel and chromium, in individuals that have been internally contaminated.

Consequence Management: Measures and activities undertaken to alleviate the damage, loss, hardship and suffering caused by an emergency. It also includes measures to restore essential services, protect public health, and provide emergency relief to affected governments, businesses and populations.

De-escalation: The process of returning the response level of an emergency plan back to "routine" or pre-emergency conditions, and indicating the start of transition to the recovery phase.

(FNEP) Designated Officials: Federal personnel, including subject matter experts, designated by their department or agency to fill specific positions to either represent their organization or to serve in a leading or supporting role within the Federal Emergency Response Management structure, as defined in the *Federal Nuclear Emergency Plan*.

Deterministic Effects or Deterministic radiological health effects: Changes in cells and tissues that are certain to occur after an acute dose of radiation (in excess of a threshold value), below which the radiation effect is not detected. The severity of health effects – such as skin reddening, burns, and hair loss – increase with the radiation dose received.

Dosimeter: A device that is worn or carried by an individual for measuring a dose of radiation.

Emergency: An abnormal situation which, to limit damage to persons, property or the environment, requires prompt action beyond normal procedures.

Emergency Management Organization: An organization put in place when a nuclear plan or "all-hazards" emergency plan is implemented, which is responsible for coordinating the response to a nuclear emergency.

Emergency Planning Zone: A defined zone around a nuclear facility for which detailed planning and preparations are made in advance to ensure that appropriate protective measures can be applied in a timely and accurate manner.

Emergency Support Function: General subject area described in the *Federal Emergency Response Plan,* which group's actions that may be taken by a primary department or agency and where the focus is exclusively on providing support in a particular sector to provinces in the response phase of an emergency.

Emergency Worker: Persons performing emergency services who are required to remain in, or to enter areas affected or likely to be affected by radiation from an accident, and for whom special safety arrangements are required. These may include police, firefighters, ambulance and emergency social services workers, and other essential services.

Evacuation: The rapid removal of people from an area to avoid or reduce high-level, short-term exposure to a hazard.

Federal Coordination Centre: As defined in the Federal Emergency Response Plan, it is the focal point for federal and federal-provincial/territorial co-ordination during response.

Federal Nuclear Emergency Plan Technical Assessment Group: A multi-departmental group composed of technical experts from designated FNEP departments and agencies, chaired by a senior technical expert.

Food Control: Measures taken to prevent the consumption of foodstuffs that have been radioactively contaminated above acceptable levels as a result of a nuclear emergency, including the supply of uncontaminated foodstuffs.

General Emergency: Emergency level adopted when there is a nuclear emergency with a radiological release or a significant risk of a radiological release to the environment.

Government Operations Centre: The federal government operations centre, administered by Public Safety Canada, which is intended to host designated officials required to fill positions in the Federal Emergency Response Management System groups located in the National Capital Region. It is established to co-ordinate national support to the affected provinces and activities under federal jurisdiction.

Health Portfolio: A term referring to both Health Canada and the Public Health Agency of Canada.

Intervention: Any action or provision beyond normal procedures undertaken to manage the emergency and mitigate its impacts, including all emergency organization structures, response actions, communications and public information and directives.

Lead Federal Minister/Department: The federal minister and department designated by the Prime Minister of Canada, or as indicated in the *Federal Policy for Emergencies* [19], to prepare arrangements and co-ordinate national activities to provide support to a province, and to co-ordinate the activities of the federal departments and agencies involved. For nuclear emergencies, the designated lead federal department is Health Canada.

Liaison Officers: Federal officials who are assigned and responsible for ensuring liaison between two or more groups either in the Federal Emergency Response Management System, the corresponding provincial or regional structures.

Medical Countermeasures: Drugs used to treat people exposed to radiation to reduce the absorbed radiation dose and hence the risk of possible future biological effects. Examples of radiological medical countermeasures: Prussian Blue, Potassium Iodide (KI), Ca-DTPA and Zn-DTPA (diethylenetriamine pentaacetate acid). They can reduce the body's uptake by blocking organs with the non-radioactive element or they can increase the elimination of the radioactive element from the body.

Notification: A punctual action by which a specific individual or an organization is formally informed of a critical event, decision or action. An example would be a notification that the *Federal Nuclear Emergency Plan* has been implemented. It should not be confused with reporting, which has specific and separate meaning.

Nuclear Emergency: An event that has led or could lead to the uncontrolled release of radioactive material, or exposures to uncontrolled sources of radiation, which pose or could pose a threat to public health and safety, property and/or the environment. This includes emergencies involving nuclear substances as defined in the *Nuclear Safety and Control Act*. Other plans may refer to these as radiological or nuclear accidents or emergencies.

Nuclear Emergency Function: Subject area defined in the Federal Nuclear Emergency Plan which groups actions specifically related to a nuclear emergency that may be taken by primary and/or supporting departments or agencies in the response phase of a nuclear emergency.

Nuclear Facility: A nuclear reactor, sub-critical nuclear reactor, research reactor, or plant for the separation, processing, reprocessing or fabrication of fissionable substances from irradiated fuel. It also includes all land, buildings and equipment that are connected or associated with these reactors or plants.

Nuclear Powered Vessel: A marine vessel whose main propulsion system is driven by a nuclear reactor.

Off-site: The area outside the boundary of a nuclear facility or of Department of National Defence land for a Category C emergency. The municipal, provincial and federal levels of government are responsible for off-site emergency planning, preparedness and response.

On-site: The area inside the boundary, or fence line, of a nuclear facility, or of Department of National Defence (DND) land for a Category C emergency. For nuclear facilities, this area is also called the exclusion area. The operators of nuclear facilities and DND/Canadian Armed Forces for Category C emergencies are responsible for on-site emergency planning, preparedness and response.

Potassium Iodide (KI): Substance used to prevent or reduce the uptake of radioactive iodine (radioiodine) by the thyroid. Potassium iodide is also known as a thyroid blocking agent.

Personal Protective Equipment: Protective clothing and respirator or other equipment designed to protect the wearer's body from injury.

Protective Action: Measure taken to reduce radiation doses which could be incurred by the population during a nuclear emergency. It is sometimes called countermeasure or protective measure.

Provincial/Territorial Emergency Measures Organization: The organization responsible for off-site emergency planning, preparedness and response in a specific province.

Prussian Blue: Drug used to increase the elimination of radioactive cesium, thallium or rubidium in individuals that have been internally contaminated.

Radiological Consequence Management: Measures and activities undertaken to minimize or alleviate the damage, loss, hardship and suffering due to the radiation hazard arising from a nuclear emergency.

Radiological Emergency: See Nuclear Emergency.

Recovery Phase: The phase during which activities focus on restoration of quality of life, social systems, economies, community infrastructures, and the environment. This phase may last up to several years after the emergency.

Reporting: Term referring to the act of informing a specific authority of a given event or situation in accordance with specific regulatory requirements or equivalent criteria.

Response Phase: The phase during which activities focus on saving human life, on treating the injured, contaminated and overexposed persons, and on preventing and minimizing further health effects and other forms of impacts. This phase may last from a few hours to several weeks after the commencement of the emergency and would be followed by a recovery phase, as necessary.

Safety Significance: The off-site impact, on-site impact and defence in depth degradation resulting from an emergency.

Sheltering: The use of a structure for protection from an airborne plume and/or deposited materials. The structure can attenuate radiation from radioactive materials deposited on the ground and reduce exposure to airborne plumes.

Site Area Emergency or Base Emergency: Events resulting in a major decrease in the level of protection for those on the site and near the facility, but not sufficient to meet criteria for a general emergency.

Stochastic Effects or Stochastic Radiological Health Effects: A term used to group radiation-induced health effects (such as cancer or inheritable diseases), which have a statistical risk. For these diseases, the probability of their occurrence increases proportionally to the radiation dose received: the higher the dose, the higher the probability of occurrence. However, at no time, even for high doses, is it certain that cancer or genetic damage will result.

Supporting Department or Agency: A federal institution assigned responsibility to support one or more emergency functions.

Task Team or Response team: A group of specialists and equipment, which may come from more than one department/agency, who work closely together during the response phase in order to carry out a very specific task (e.g., dose prediction). A task team reports to a specific group of the emergency management structure.

Thyroid Blocking agent: See Potassium Iodide (KI).

Urgent Protective Actions: Actions that must be taken promptly in order to be effective, and the effectiveness of which will be markedly reduced if delayed. They include evacuation, sheltering, and administration of thyroid blocking agent.

C APPENDIX C | *Summary of Radiation Resources in B.C. Health Authorities**

SITE	MEDICAL COUNTERMEASURES
INTERIOR HEALTH	
East Kootenay Regional Hospital (Cranbrook)	No
Kootenay Boundary Regional Hospital (Trail)	No
Kelowna General Hospital	No
Vernon Jubilee Hospital	No
Royal Inland Hospital (Kamloops)	Yes – KI
ISLAND HEALTH	
Royal Jubilee Hospital (Victoria)	Yes – KI
Nanaimo Regional General Hospital	No
Victoria General Hospital	No
LOWER MAINLAND (FRASER HEALTH, PROVINCIAL HEALTH SERVICES AUTHORITY, VANCOUVER COASTAL HEALTH, PROVIDENCE HEALTH CARE)	
Abbotsford Regional Hospital	No
BC Children & Women's Hospital	No
Burnaby Hospital	No
Jim Pattison Out patient Centre (Surrey)	No
Lions Gate Hospital (North Vancouver)	No
Richmond Hospital	No
Royal Columbian Hospital (New Westminster)	No
Saint Paul's Hospital (Vancouver)	No
Surrey Memorial Hospital	No
Peace Arch Hospital	No
UBC Hospital	No
Vancouver General Hospital	Yes – KI

NOTE: For all health care sites listed above, there is monitoring and radiation detection of gamma, alpha and beta radiation and decontamination capability. The specific equipment for radiation detection and radiation monitoring varies between sites, with G-M tubes and scintillation detectors being the most common. Some ion chambers are also available.

Resources are as of June 2014 – for real time summary of resources consult with the radiation safety officers and/or medical physicists at each health authority.

D APPENDIX D | *Radiation In General*

Radiation is energy that comes from a source and travels through material or space. Every day, Canadians come in contact with radiation in both their living and work environments. Radiation can be classified as ionizing or non-ionizing. The ionization of molecules can lead to radiolysis, i.e., breaking chemical bonds, and formation of highly reactive free radicals which in turn may react chemically with neighbouring materials even after the original radiation has stopped.

The Electromagnetic Spectrum

Sources of naturally occurring radiation include:

- radioactive material found in rocks and soils
- radon
- cosmic radiation
- ultraviolet radiation from the sun

Radiation can also be generated by artificial sources, including:

- Medical or clinical devices such as X-ray machines and ultrasound devices.
- Household or personal products such as microwave ovens and cell phones.
- Industrial or commercial equipment such as telecommunication towers and nuclear power generating stations.
- Nuclear fallout resulting from past military experimentation and weapons development.
- Wounds contaminated by radioactive material can also be a source of exposure.

Ionizing radiation is a part of Canada's environment. It can occur as electromagnetic rays (i.e., X-rays and gamma rays) or particles (i.e., alpha and beta particles) and originates from either natural (e.g., from the radioactive decay of natural radioactive substances such as radon gas and its decay products) or artificial sources. People can be exposed externally (e.g., X-rays), or internally if a radioactive substance is inhaled or ingested or absorbed through intact skin. Thus, all Canadians are continually exposed to radiation from these sources.

E APPENDIX E | *Common Communication Errors Made in Assessment of the Radiological Health Hazards (Iaea, 2013)*

COMMON ERRORS	EXPLANATION AND POSSIBLE CONSEQUENCES
NOT ANSWERING *the public's principle question:* 'Am I safe?'	▸ Assessments that do not answer the public's principle question: 'Am I safe?' may result in unjustified actions being taken by the public and/or decision makers that do more harm than good in the belief that they are making themselves and others safe.
NOT CLEARLY STATING *that all members of the public, including children and pregnant women (and the fetus), have been considered, as well as the ways they have been exposed*	▸ Assessments that do not consider the members of the public most sensitive to radiation (i.e. children and pregnant women) and/or all the ways they can be exposed (or not clearly explained that this was considered), may result in unjustified actions by the public and/or decision makers that do more harm than good in the belief they are protecting all members of the public to include the most sensitive to radiation.
NOT PROVIDING *a consistent assessment of the health hazard (e.g. having several sources of official information) and/or using undefined or ambiguous terms*	▸ Assessments that are inconsistent and/or ambiguous will result in confusion and undermine public confidence in official statements.
USING EARLY, INCOMPLETE OR UNCERTAIN *data without clearly indicating the possible health hazard*	▸ Assessments that use incomplete and/or uncertain data could result in an over or underestimation of the health hazard and lead to changing assessments as the data improves, which could undermine public confidence. If early data is used it needs to be made clear that these are preliminary assessments expected to change as new and/or improved data becomes available.
USING EFFECTIVE DOSE	▸ Assessments that are based only on effective dose are unreliable. Effective dose cannot be used to reliably assess the possible radiation induced health effects [24, 36]. The use of effective dose can underestimate the health hazard for a release from a reactor core or spent fuel pool.
USING SIEVERT *(Sv) without clearly stating what quantity it represents*	▸ Assessments that do not clearly state the type of Sievert being used are not useful. Several different dosimetric quantities (e.g. equivalent dose to an organ or tissue, effective dose, ambient dose equivalent or personal dose equivalent) are given in sieverts and although the units are the same, these are different quantities that cannot be compared [24, 36]. Only equivalent dose, which is the dose to a particular person's organ or tissue (e.g. thyroid), can be used to assess the possible health effects, but only if it has been calculated correctly (See section 7.5 for further information).
PROJECTING EXCESS CANCER DEATHS	▸ Assessments that project excess cancer deaths are unreliable. This is because it is impossible to predict the possible number of cancers resulting from an emergency within the first months to years after the emergency. The only way that excess cancers can be detected with certainty is by studying cancer statistics for the population affected by high doses over a period of many years. At low doses (doses below the international generic criteria calling for protective or other response actions), there will not be an observable increase in the incidence of cancer, even in a very large exposed group.

COMMON ERRORS	EXPLANATION AND POSSIBLE CONSEQUENCES
PROJECTING EXCESS CANCER DEATHS *(continued)*	▸ Projections of excess deaths are often based on inappropriate use of the fatal risk coefficient (as "deaths per sievert of collective effective dose") given by the International Commission on Radiation Protection (ICRP) and others. This coefficient was intended to be used for the purposes of radiological protection only, and its use for projecting health consequences was never intended, as stated by ICRP [36], for the following reasons: ▸ Because of the uncertainty of health effects at low doses, the ICRP judges that it is not appropriate, for the purposes of public health planning, to calculate the hypothetical number of cases of cancer or heritable disease that might be associated with very small radiation doses received by large numbers of people over very long periods of time [36]. ▸ Collective effective dose is not intended as a tool for epidemiological risk assessment, and it is inappropriate to use it in risk projections. The aggregation of very low individual doses over extended time periods is inappropriate, and in particular, the calculation of the number of cancer deaths based on collective effective doses from trivial individual doses should be avoided [36].
COMPARING DOSES *with 'safety' limits implying health effects are possible if the limits are exceeded.*	▸ Assessments that compare doses with 'safety' limits are unreliable because these limits are typically established as part of the license requirements for the nuclear power plant and exceeding these limits does not mean that the situation is unsafe. These limits are established to ensure the safe operation of the nuclear power plant by limiting releases to levels well below those at which health effects will occur.
USING TERMS *such as 'high dose rates' or 'highly contaminated', Bq/m^2, and '100 times above normal levels' without making it clear how this is related to the possible health hazard*	▸ Assessments that use these terms are meaningless and could imply an exaggerated or understated health hazard.
MAKING IRRELEVANT COMPARISONS *with other exposure situations, for example comparing the calculated dose with a dose received from an X-ray or an intercontinental flight*	▸ Assessments that compare the calculated dose with other exposure situations can lead to underestimations of the health hazard. These doses cannot be compared due to the different types of radiation and the different exposure pathways that are possible in the context of a reactor core or spent fuel release (e.g. the dose from inhalation of radioiodine and the possible health effects to the thyroid gland).
USING ONLY EXTERNAL DOSE RATE	▸ Assessments that only use external dose rate are unreliable because this only considers external exposure, which can greatly underrepresent the health hazard. This is because other important exposure pathways such as inhalation from the passing plume or inadvertent ingestion of radioactive material have not been considered.
NOT CONSIDERING *the fact that the dose is a calculated quantity that must be calculated in a very specific way in order to correctly place its health hazard into prescriptive, as described in Section 7.5. Any dose calculation needs to clearly state steps and assumptions used in the calculations*	▸ Assessments that do not explain in detail how the calculations were performed are unreliable. Dose is a calculated quantity that must be determined in a very specific way in order to correctly place its health hazard into perspective.

International Atomic Energy Agency (2013).
Actions to Protect the Public in an Emergency due to Severe Conditions at a Light Water Reactor.

F APPENDIX F | *Canadian Nuclear Safety Commission Recommended Turn-Back Dose Rates and Maximum Permissible Dose*

The Canadian Nuclear Safety Commission recommends the following Turn-Back Dose Rates and Maximum Permissible Dose (MPD):

- *Routine situation (non-emergency):*
  MPD: 0.5 mSv (500 µSv)
  Turn-back dowse rate: 1 mSv/h*
- *Emergency sitwuation: MPD:*
  250 mSv (250,000 µSv)
  Turn-back dose rate: 1000 mSv/h* (1 Sv/h)
- *Life Saving:* Unlimited (volunteer basis)

**If any meter you are using goes off scare, turn back.*

G APPENDIX G | *Details of Federal Nuclear Emergency Plan Resources and Services*

Requests for Federal Nuclear Emergency Plan (FNEP) resources should be directed to the FNEP designated official or the Technical Assessment Group chair if the Provincial Emergency Coordination Centre is activated. Requests for emergency medical countermeasures, medical units or other items from the National Emergency Strategic Stockpile (NESS) are to be made directly to the NESS duty supervisor, or via the Health Portfolio Operations Centre (if during off-hours) by the Ministry of Health.

Available resources are grouped below according to their alignment with the four phases of emergency response: Mitigation/Prevention, Preparedness, Response and Recovery.

PREPAREDNESS

Training

The Radiation Protection Bureau offers a number of training courses that are designed to meet the needs of specific stakeholders. These training courses range from basic awareness sessions (Radiation Basics) to more comprehensive and operational-level training (Medical Emergency Treatment for Exposures to Radiation, Field Response). Requests for on-demand training opportunities will be considered based on operational feasibility and available resources, but it should be noted that not all training can be delivered on-demand. In situations where on-demand training requests cannot be accommodated, appropriate third-party training courses can be recommended.

Radiation Basics

Radiation Basics is a short course (0.5-1.0 hours) intended to familiarize participants with essential information of radiation and radioactive decay, how radiation exposure occurs, and protective measures that can be taken to reduce exposure. The course format is electronic, and can be delivered either in person or remotely. This course is intended for those who need a basic understanding of the concepts and principles involved in radiation and radiological/nuclear emergency management.

Medical Emergency Treatment for Exposures to Radiation (METER)

The objective of the METER course is to enhance the Canadian medical community's preparedness in responding to a radiological/nuclear event. This course raises awareness and knowledge of participants regarding radiation safety and improves the ability of participants to respond to, manage, and treat casualties from a radiological or nuclear event. The topics covered in METER:

- The basics of radiation biology;
- Acute radiation cutaneous syndrome;
- Decorporation agents and how to manage internal contamination;
- How to manage potentially contaminated patients in an emergency department;
- The procedures necessary to triage, transport and manage patients during and after a radiological or nuclear event;
- That serious injuries requiring emergency treatment supersedes the need to decontaminate
- Wound decontamination and patient decontamination; and
- That emergency personnel are rarely exposed from treating patients contaminated with radiological material when proper personal protective equipment is worn.

The target audience for the course includes first responders (paramedics, fire and police), first receivers (emergency room physicians, triage nurses,

emergency room nurses, radiation safety officers, nuclear medicine personnel), and emergency management coordinators, planners and trainers. Requests or inquiries for this course should be directed to Health Canada or the Radiation Protection Bureau.

Field Response Training

Health Canada's Field Response Training is an intensive week-long course that provides training in both radiation/radioactive decay theory and field techniques used to detect and remove radioactive materials. During the classroom portion of the training, participants learn the principals and concepts involved in radiation, radioactive decay and ionizing radiation, how radiation is measured, the concepts of dose and dosimetry, and common exposure pathways. Participants will also learn the theory behind, and standard operating procedures to be used, with personal protective equipment (donning/doffing), personal dosimeters (passive and alarming), and the use of specialized radiation detection equipment. In the field, participants will apply these concepts using specialized radiation detection equipment in several mock-scenarios to locate, identify and remove radioactive sources. Practical experience will be gained in the set-up, operation and take-down of a field command post, decontamination tents and population monitoring stations. This course is appropriate for individuals who regularly work in a field environment during a radiological/nuclear emergency. This course is offered once per year if resources permit.

Exercises

Following the endorsement of the *Federal Nuclear Emergency Plan* (5th Edition) by the Deputy Ministers Emergency Management Committee in October 2012, an exercise program designed to validate the FNEP was developed by the Health Portfolio along with FNEP partners. This program is composed of a series of exercises and workshops designed to raise awareness of the new FNEP, assess inter-jurisdictional emergency management co-ordination and familiarize participating organizations with the roles, responsibilities and capabilities of Health Canada and FNEP partner organizations during a radiological/nuclear emergency.

Co-ordination Meetings

The federal government collaborates with provinces and territories to develop and maintain the national emergency preparedness and response framework. As elaborated in *An Emergency Management Framework for Canada*, the Senior Officials Responsible for Emergency Management provides a forum for federal, provincial, and territorial discussions and emergency response integration. Working groups are established to support intergovernmental collaboration on issue-specific multi-stakeholder aspects.

Within this governance structure, the planning organization for the ***Federal Nuclear Emergency Plan*** (FNEP) is supported by two standing nuclear emergency preparedness advisory committees (Table 4). Health Canada provides the chair and secretariat for these committees.

COMMITTEES	MANDATE
INTERDEPARTMENTAL RADIOLOGICAL-NUCLEAR EMERGENCY MANAGEMENT COORDINATING COMMITTEE, *chaired by Health Canada*	▸ To facilitate co-ordination of federal nuclear emergency preparedness and response arrangements, maintenance of the FNEP, information exchange and joint projects in the areas of nuclear emergency preparedness programs, response standards, emergency assistance, exercises and other related issues
FEDERAL/PROVINCIAL/ TERRITORIAL RADIOLOGICAL -NUCLEAR EMERGENCY MANAGEMENT COORDINATING COMMITTEE, *chaired by Health Canada with a provincial co-chair*	▸ To facilitate co-ordination of federal nuclear emergency preparedness and response arrangements with the provinces and territories, and provide a forum for information exchanges and development of plans and joint projects to improve nuclear emergency management, including the co-ordination, development and implementation of a long-term exercise program

TABLE 6: *Federal Nuclear Emergency Plan Co-ordination and Committee Meetings*

RESPONSE

In the event of an actual or potential nuclear emergency, federal support to the Province of B.C. could be provided in the form of surge capabilities involving some or all of the capabilities described below. The actual capabilities required will depend on the specific circumstances of the emergency and will be identified either as a default measures for serious nuclear emergencies or will be decided on the basis of joint discussions between the chair of the Federal Nuclear Emergency Plan Technical Assessment Group and a senior scientific official in the Provincial Emergency Coordination Centre.

Surveillance & Environmental Monitoring[1]

Health Canada operates several environmental radiation monitoring networks across Canada. Information and data gathered from these networks will be shared with the Province prior, during and following a nuclear emergency to support protective actions and consequence management decision making and recovery operations. Major B.C. stakeholders can request access to Health Canada's web mapping application (E-MAP) in order to receive and view environmental and surveillance monitoring information and data.

2 More information on locations of monitoring networks can be obtained at: *www.hc-sc.gc.ca/hc-ps/ed-ud/respond/nuclea/data-donnees-eng.php*

Fixed-Point Surveillance Network

The Fixed Point Surveillance (FPS) network is a network of real-time radiation detection equipment located across Canada and a single *Data Centre*, which collects, analyses and stores the data measured at each of these monitoring stations. This data centre is located at the Radiation Protection Bureau in Ottawa and communicates with the stations on a daily or as-needed basis. The network includes monitoring stations installed by Health Canada plus several stations that are owned and operated by the nuclear operators who share their data with Health Canada. The network provides ambient gamma dose rates and can be used in the event of a nuclear emergency to identify radioactive contamination in the air or deposited on the ground as a result of an atmospheric release of radioactive material.

Canadian Radiological Monitoring Network

The Canadian Radiological Monitoring Network (CRMN) is a national network of monitoring stations that routinely collect air, precipitation, external gamma dose, drinking water, atmospheric water vapour and milk for radioactivity analysis. The CRMN was initiated in 1959 to monitor environmental releases of radioactivity from atmospheric nuclear weapons testing and accidental releases from nuclear facilities. The network provides a mechanism for measuring routine or accidental releases of radioactivity in environmental samples. There are 29 environmental monitoring stations, plus additional sites in the vicinity of nuclear reactor locations. Samples collected at these stations are analysed at Health Canada's radio-analytical laboratories in Ottawa.

Comprehensive Nuclear Test-Ban Treaty Network

The Radiation Protection Bureau maintains a network of four Comprehensive Nuclear Test-Ban Treaty (CTBT) radionuclide monitoring stations across the country (including one in Vancouver) and a radionuclide laboratory to perform detailed radionuclide analysis. In a nuclear emergency, these highly sensitive, high throughput CTBT stations can offer valuable information, albeit not immediately, to the Federal Nuclear Emergency Plan Technical Assessment Group on any fugitive or actual releases from a nuclear licensed facility. These can be used to characterize the nature and approximate quantity of radioactivity released to the atmosphere, assisting authorities to assess the hazards and risks.

Mobile Monitoring Systems (aerial, vehicle -borne and ground surveys)

Health Canada and Federal Nuclear Emergency Plan partner organizations maintain capabilities to perform aerial and ground surveys for the detection, identification and characterization of contamination and/or lost or orphan source(s) following a nuclear emergency. Aerial surveys conducted by Natural Resources Canada can be used to provide information on contamination over wide-range geographical areas, while vehicle-borne surveys can be used to provide information on a mid-range scale. The teams involved in both the aerial and vehicle-borne surveys have the capacity for data exchange and scientific reach-back to SMEs in the Federal Nuclear Emergency Plan Technical Assessment Group located in Ottawa or at the Provincial Emergency Coordination Centre. Real-time or near real-time data capture and visualization of survey results is available through Health Canada's web mapping application (E-MAP). The ground survey teams are responsible for the identification and characterization of ground-based contamination, for sample preparation and analysis, and conducting sampling of air, food, feed and water as directed or requested by the federal or provincial authorities. They can also direct some of the samples to

mobile nuclear laboratories and a communications trailer located in the field, and to the various fixed radiological laboratories for analysis.

Mobile Nuclear Laboratories (MNLs)

The Mobile Nuclear Laboratories (MNLs) are part of the Government of Canada's deployable capabilities in support of the ***Federal Nuclear Emergency Plan (FNEP)***. The MNLs and scientific staff support the federal government in radiological consequence management by providing expert scientific advice for radiation protection matters. The DND/CAF director of Nuclear Safety also has staff that can be deployed and work with MNLs to provide radiological scientific advice. Health Canada, Canadian Nuclear Laboratories and Defence Research and Development Canada maintain MNLs, a Mobile Coordination Centre (satellite communications, high speed internet, generators, workspaces, multimedia), inflatable tents and equipment trucks, which can provide the following capabilities:

- Radioisotope quantification and identification;
- Contamination control;
- Rapid field deployment (rapid response kit);
- Scientific reach-back to municipal, provincial and federal Emergency Operations Centres;
- Decontamination and population screening; and
- Emergency dosimetry services.

MNLs are normally deployed on request, in the post release phase of an emergency, with a suite of assets and scientific staff to support off-site or field radiological monitoring. In certain circumstances, one or a few of the MNL assets/capabilities may be requested or needed. These requests will be assessed and prioritized by the FNEP Technical Assessment Group and Technical Specialists Team in the Provincial Emergency Coordination Centre depending on the nature of the situation and operational feasibility.

Technical Assessments

As previously described, the Technical Assessment Group will obtain information from any and all relevant and credible sources, share and exchange data with the Technical Specialists Team in the Provincial Emergency Coordination Centre in order to provide the best possible products to all decision making authorities to implement all required protective and corrective actions that may be required as part of the consequence management to a nuclear emergency. These products are defined under supporting documents to the ***B.C. Nuclear Emergency Plan*** and the ***Federal Nuclear Emergency Plan***.

Emergency Dosimetry Services

Health Canada maintains multiple emergency dosimetry kits that can be deployed or loaned to the Province during an emergency. Each kit contains twenty (20) electronic personal dosimeters and four hundred (400) passive dosimeters, portable dosimeter readers, a laptop and requisite software to track and monitor dosimeter readings, power cords, extension cords, native user guides plus a dosimetry kit user guide. Upon request, Health Canada can provide additional dosimetry devices to deal with larger surge demands for emergency response. Health Canada can deploy up to 60,000 passive dosimeters, 300 electronic personal dosimeters and 10 portable dosimeter readers (with laptop, software, and user guides). Expert advice and recommendations on doses and exposures can be requested from the Technical Assessment Group.

Biodosimetry and Bioassay

The Bioassay Laboratory within Radiation Protection Bureau's National Calibration Reference Centre for Bioassay and In Vivo Monitoring provides in vitro radiobioassay services and programs. The Bioassay Laboratory conducts research in radionuclide metabolism and biokinetics, health effects of internal radioactive contamination, and bioassay and internal dosimetry support to the ***Federal Nuclear Emergency Plan***. Services include:

- Bioassay measurements and internal dose assessment for suspected radionuclide intakes using whole body and organ counting and external counting at wound sites;
- Identification of the levels of specific radionuclides in body excreta and other biological materials (nose swabs, hair and blood samples);
- Determination of the committed effective dose;
- Interpretation of effectiveness of decorporation treatments.

The radiobiology division of Health Canada's Consumer and Clinical Radiation Protection Bureau (HC-CCRPB) can provide emergency cytogenetic biodosimetry services for individuals or mass casualties exposed to ionizing radiation. Analysis of chromosomal aberrations in human peripheral blood lymphocytes is the present day standard for the biological assessment of ionizing radiation exposure. For individual exposures, dose estimates in the range of 0.1 to 5 Gy can be performed. HC-CCRPB and partners of the Canadian Cytogenetic Emergency Network, have the capacity to process larger quantities of samples for the cytogenetic triage of mass casualties. In mass casualty events, only doses above 1 Gy will be identified.

Population Monitoring

Health Canada maintains a deployable capability to perform population monitoring for radionuclide contamination during an emergency. Depending on the scope of the event, and as resources permit, specific Technical Assessment Group task teams and resources may be deployed to support the Province in the provision of these services. Screening services will be provided as surge capacity or in complement to population monitoring stations already set up by the Province. Deployment times in B.C. are estimated at 24-39 hours, and require integration into an existing provincial or municipal reception facility or emergency worker centre. Requests for population monitoring must be supported by appropriate and adequate facilities and services to be provided by the Province or regional municipality in B.C., including but not limited to crowd control, security, health services, registration and demographic information capturing etc. Requests should be made through the Federal Nuclear Emergency Plan liaison officer (if present in the Provincial Emergency Coordination Centre, or at the Federal Nuclear Emergency Plan Technical Assessment Group).

National Emergency Strategic Stockpile

The Public Health Agency of Canada in the Health Portfolio maintains a National Emergency Strategic Stockpile (NESS) to provide health and social service supplies quickly to provinces and territories when their own resources are not enough during an emergency. A 24-hour response capability is maintained, and assets can be deployed within 24 hours depending on circumstances of the event. The system consists of a central depot in Ottawa, as well as a number of other warehouses and pre-positioned sites (under the combined management of the provinces and federal government) strategically located across Canada.

The NESS contains various assets, such as social service supplies, medical equipment and supplies, and pharmaceuticals, including a range of antibiotics and medical countermeasures for internal

radiological contamination (Prussian Blue, Ca and Zn-DPTA, KI). As well, it maintains mini clinics, which are a compilation of medical equipment, and medical supplies that would typically be found in a walk-in-clinic and offer primary care for less urgent patients. The mini clinics can by deployed on short notice (within 24 hours) to be set up in existing buildings such as schools and community centers. Pre-positioned supply centers have a mix of supplies depending on their location and anticipated emergencies that might occur.

RECOVERY

The ***Federal Nuclear Emergency Plan*** (FNEP) addresses the immediate off-site response actions to a nuclear emergency. Once the situation has stabilized and immediate actions for the protection of public health and safety have been completed, emergency management of the radiological hazard will shift from the response phase to recovery phase and the FNEP response level will return to routine operations.

Responsibility for recovery from a nuclear emergency in B.C. is largely within the jurisdiction of the Province of British Columbia. The decision to transition to recovery operations will be taken by the Province in the case of an emergency occurring in B.C., and by federal authorities in areas of federal jurisdiction or for a nuclear emergency outside North America. Some FNEP partners and FNEP designated officials may be involved in support of restoration efforts of the affected areas. Individual departments will engage in Government of Canada action planning and implementation of recovery activities in accordance with their primary and supporting responsibilities in the emergency support functions.

Return to Routine Monitoring

When the focus of activities shifts from emergency response to recovery activities, the FNEP senior official in consultation with the Federal Nuclear Emergency Plan (FNEP) Technical Assessment Group chair, Emergency Management and Programs ADM, and federal co-ordinating officer will recommend the return of the FNEP response level to routine monitoring, and stand down of some or all components of FNEP not required for transition to recovery. This may be done independently of, but in co-ordination with, the overall Federal Emergency Response Plan response level and operations of the Federal Emergency Response Management System (FERMS), specifically in situations where the non-radiological impacts of the situation are not yet stabilized.

The ADM Committee, in consultation with the Privy Council Office, will approve the transition to recovery and termination of the emergency. Complementary actions include:

- Designating a primary federal minister for recovery and a national recovery co-ordinator; and
- Approving the time frame for hand-over from the federal co-ordinating officer and FNEP senior official to a national recovery co-ordinator.

The national recovery co-ordinator will be responsible for identifying federal recovery priorities in consultation with provinces, and for assembling and co-ordinating a National Recovery Support Organization to implement the federal recovery activities. This will normally include information on recovery issues identified by the FNEP Technical Assessment Group. The National Recovery Support Organization may contain elements of the FERMS. The transition to recovery of all affected areas and hand-over to the national recovery co-ordinator signify closure of the response phase.

NOTES

NOTES

BRITISH COLUMBIA | Ministry of Health

EMERGENCY MANAGEMENT UNIT
BRITISH COLUMBIA MINISTRY OF HEALTH

1515 Blanshard Street
Victoria, B.C. V8W 3C8

Telephone: 250 952-2611
Facsimile: 250 952-2497

Fenton, Chrystal TRAN:EX

From: Duffy, Chris D TRAN:EX
Sent: Friday, May 12, 2017 11:41
To: Karger, Kristina TRAN:EX
Subject: RE: afternoon CCG

From: Karger, Kristina TRAN:EX
Sent: Friday, May 12, 2017 11:39
To: Duffy, Chris D TRAN:EX
Subject: RE: afternoon CCG

Same agenda minus the Nuclear update?

Agenda:

- Introductions - EMBC
- Environment Canada Forecast – Matt McDonald
- River Forecast Centre Update – David Campbell
- EMBC Update – Chris Duffy
- ~~Hanford Nuclear Plant Incident in Washington State – Kathryn Forge, HEMBC~~
- Round – table / agency updates
- Other

Kristie Karger | Executive Coordinator
Office of the Assistant Deputy Minister
Emergency Management BC
Ministry of Transportation and Infrastructure

From: Duffy, Chris D TRAN:EX
Sent: Friday, May 12, 2017 11:38
To: Karger, Kristina TRAN:EX
Subject: RE: afternoon CCG

TY

From: Karger, Kristina TRAN:EX
Sent: Friday, May 12, 2017 11:35
To: Duffy, Chris D TRAN:EX
Subject: RE: afternoon CCG

Will do.

Kristie Karger | Executive Coordinator
Office of the Assistant Deputy Minister
Emergency Management BC
Ministry of Transportation and Infrastructure

From: Duffy, Chris D TRAN:EX
Sent: Friday, May 12, 2017 11:25
To: Karger, Kristina TRAN:EX
Cc: TRAN EMBC PECC Director 1 TRAN:EX; Anderson, Gordon A TRAN:EX; Denlinger, Becky TRAN:EX
Subject: FW: afternoon CCG

Please set a **14:30** CCG for us Kristie

TY

From: MacDonald, Matt (EC) [mailto:matt.macdonald@canada.ca]
Sent: Friday, May 12, 2017 11:23
To: Duffy, Chris D TRAN:EX; Campbell, David FLNR:EX
Subject: RE: afternoon CCG

Sorry, was evacuated for fire alarm...

1430 works. I have to brief NE at 1500.

Matt

From: Duffy, Chris D TRAN:EX [mailto:Chris.Duffy@gov.bc.ca]
Sent: 12 mai 2017 11:18
To: Campbell, David FLNR:EX; MacDonald, Matt (EC)
Subject: RE: afternoon CCG

TY

Matt??

From: Campbell, David FLNR:EX
Sent: Friday, May 12, 2017 11:12
To: Duffy, Chris D TRAN:EX; 'MacDonald, Matt (EC)'
Subject: RE: afternoon CCG

HI Chris

A 1330 or 1430 would work best for me

Cheers
Dave

From: Duffy, Chris D TRAN:EX
Sent: Friday, May 12, 2017 11:03 AM
To: Campbell, David FLNR:EX; 'MacDonald, Matt (EC)'
Subject: afternoon CCG

Hi gents

Would you be able to support a CCG call this afternoon ?? start preference ???

1330

1400

1430

1500

Christopher Duffy
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