ONTARIO POWER GENERATION

EB-2025-0297

FOR TECHNICAL CONFERENCE PANEL 3

DARLINGTON NEW NUCLEAR PROGRAM

OAPPA COMPENDIUM

MONDAY JUNE 1ST, 2026

Table 1.6-1: Comparison of BWRX-300 to Other NPP Types

Fundamental Safety Function	BWRX-300	BWRs	PWRs	CANDU
Control Reactivity	Two Independent Means of Shut Down	Two Independent Means of Shut Down	Two Independent Means of Shut Down	Two Independent Means of Shut Down
Fuel Cooling	Passive Natural Circulation	Active Forced Circulation	Active Forced Circulation	Active Forced Circulation
Contain Radioactivity	Dry Passive Cooling	Wet Active Cooling	Dry Active Cooling	Dry Reactor Building Wet Vacuum Building Active Reactor Building Cooling

1.6.2 Industry Incident Reviews

Station Blackout events have historically been the most demanding for BWRs to cope with and have usually been the dominant sequence for Severe Accident scenarios. The BWRX-300 is an advanced passive reactor design that does not require active safety systems. The BWRX-300 design carried forward the passive ICS and containment cooling concepts from the ESBWR. DC power sources are assumed to be available. The systems that support FSF and plant monitoring are designed to operate for 72-hours, without AC power, and without an intake structure that normally provides cooling water. The ICS pools and spent fuel pool have enough inventory to provide adequate decay heat removal and fuel cooling for seven days, after which alternate water makeup sources (e.g., flexible mitigation/EME) are used to refill the pools. The Passive Containment Cooling System (PCCS) is designed to passively limit containment pressure and temperature by transferring heat to the equipment pool. The demonstration of plant safety functions during a beyond design basis external event such as an earthquake that creates these conditions is typically part of the diverse and flexible coping strategies that form the basis for compliance of regulatory requirements related to the Fukushima tsunami event.

In April 2012, the Institute of Nuclear Power Operations conducted an independent review of the Fukushima nuclear accident with the purpose of identifying operational and organizational lessons learned from the accident. The results of this review are well documented.

The Fukushima accident was a Beyond Design Basis event. Design extension conditions are a selected subset of Beyond Design Basis accident conditions.

The BWRX-300 is designed for Design Extension Conditions, and these are described in detail in the BWRX-300 Safety Strategy.

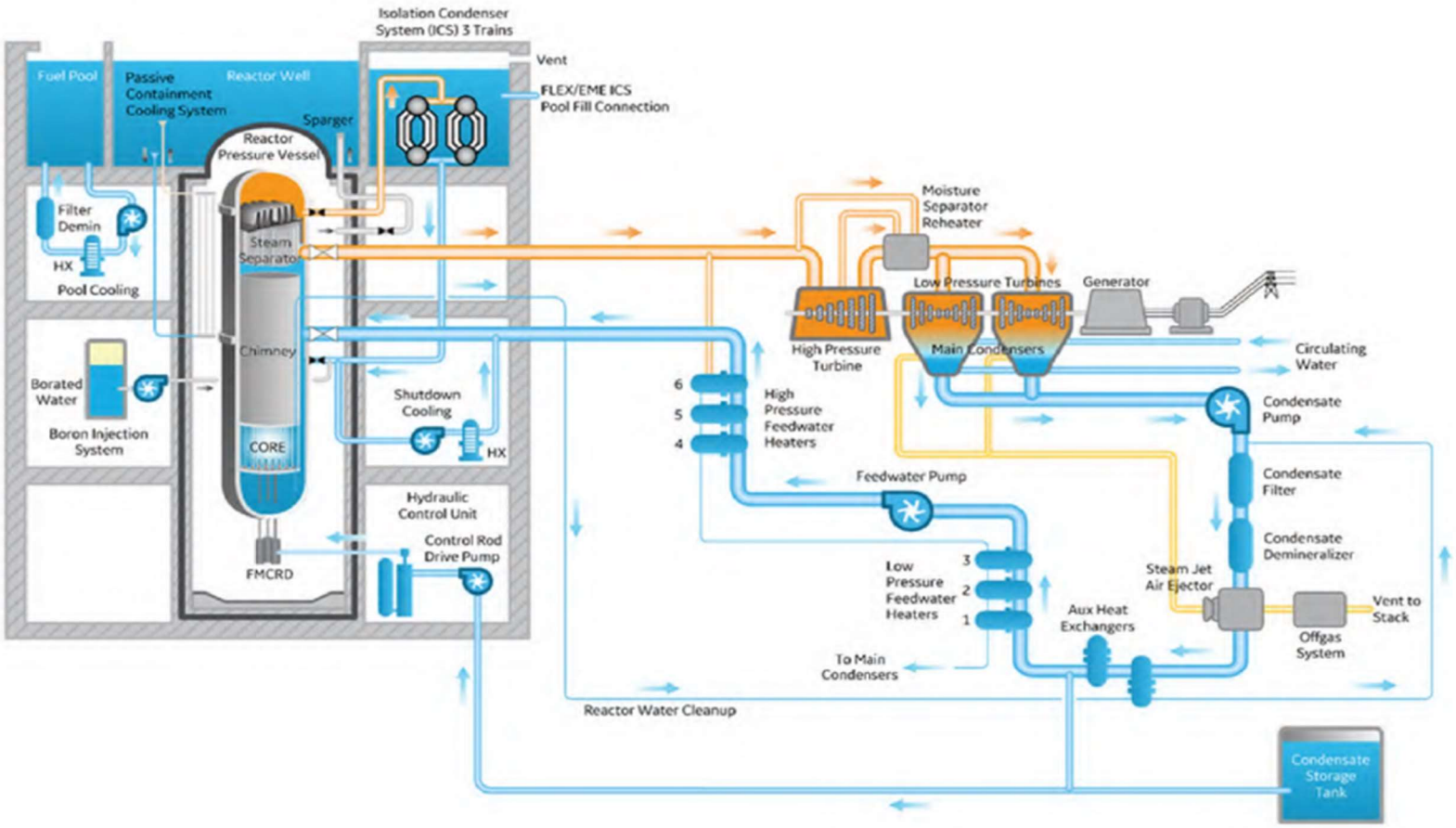
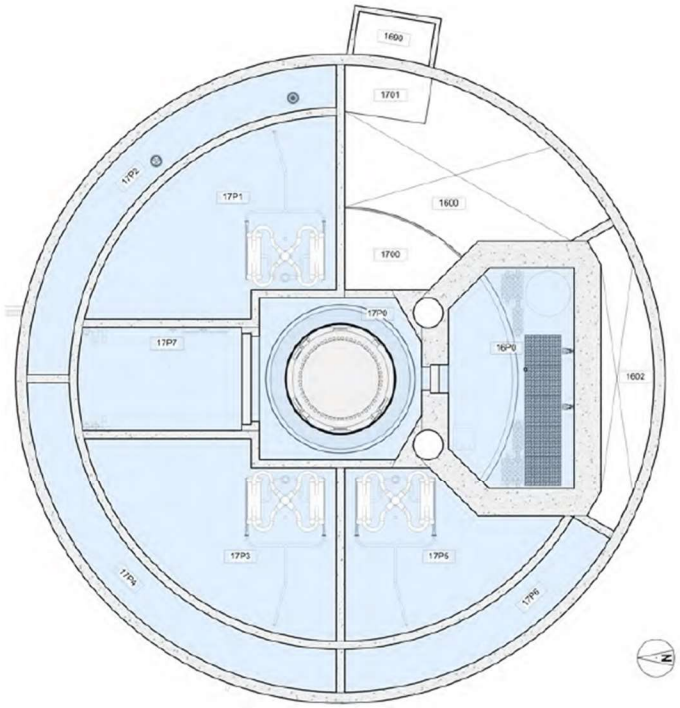


Figure 1.7-1: BWRX-300 Major Systems



Radiation Zones Level 4.9

ROOM	DESCRIPTION	FULL POWER	SHUTDOWN
1600	TRUCK BAY	C	B
1602	HALLWAY	B	B
1700	TRUCK BAY MEZZANINE 1	B	A
1701	TRUCK BAY MEZZANINE 2	B	B
16P0	FUEL POOL**	I	I
17P0	REACTOR CAVITY POOL**	J	F
17P1	ISOLATION CONDENSER A	C	C
17P2	ISOLATION CONDENSER POOL A	B	B
17P3	ISOLATION CONDENSER B	C	C
17P4	ISOLATION CONDENSER POOL B	B	B
17P5	ISOLATION CONDENSER C	C	C
17P6	ISOLATION CONDENSER POOL C	B	B
17P7	EQUIPMENT POOL**	C	D
1690	STAIRWELL C	B	A

** Zone J during spent fuel transfers

A	≤ 6 µSv/h	(0.6 mrem/h)	UNCONTROLLED & UNLIMITED ACCESS
B	≤ 10 µSv/h	(1 mrem/h)	CONTROLLED & UNLIMITED ACCESS
C	≤ 50 µSv/h	(5 mrem/h)	CONTROLLED & LIMITED ACCESS (20 h/wk)
D	≤ 250 µSv/h	(25 mrem/h)	CONTROLLED & LIMITED ACCESS (4 h/wk)
E	≤ 1 mSv/h	(100 mrem/h)	CONTROLLED & LIMITED ACCESS (1 h/wk)
F	≤ 10 mSv/h	(1 rem/h)	CONTROLLED & LIMITED ACCESS[1]
G	≤ 100 mSv/h	(10 rem/h)	CONTROLLED & LIMITED ACCESS[1]
H	≤ 1 Sv/h	(100 rem/h)	CONTROLLED & LIMITED ACCESS[1]
I	≤ 5 Sv/h	(500 rem/h)	CONTROLLED & LIMITED ACCESS[1]
J	> 5 Sv/h	(500 rem/h)	INACCESSIBLE AREA

1. Areas designated as "Controled Infrequent Access" require explicit authorization permits

Figure 12.6-8: Reactor Building Level 4.9 Meters Radiation Zones

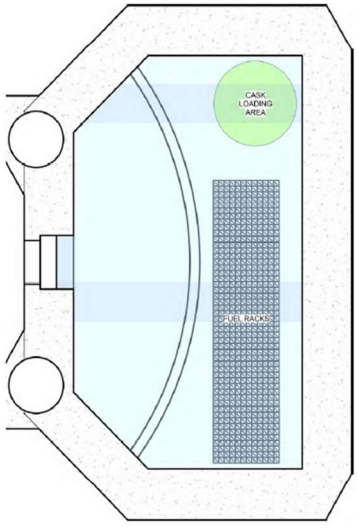


Figure 9A.1.2-1: Fuel Pool Arrangement

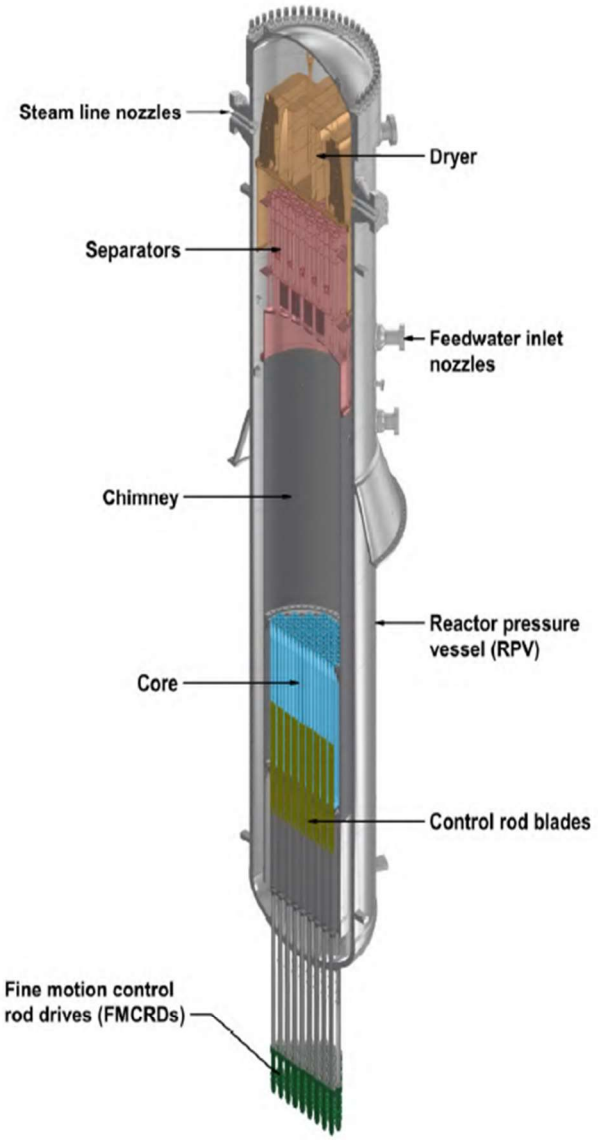


Figure 1.7-2: BWRX-300 RPV and Internals

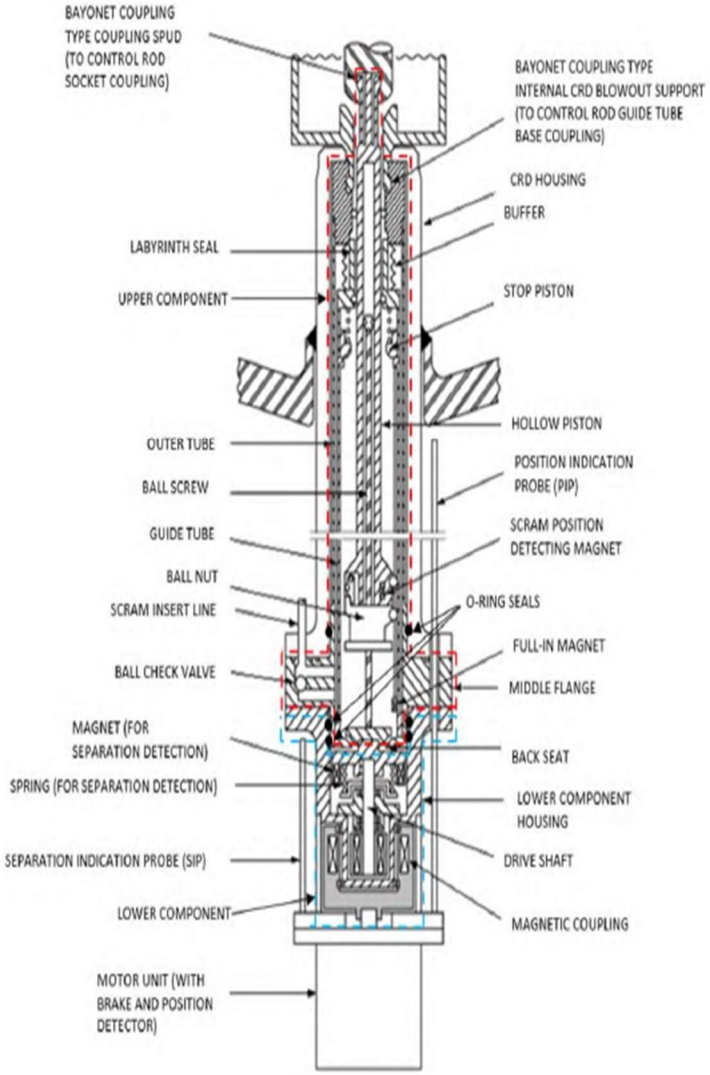


Figure 4.6-3: Schematic Representation of Magnet Coupling Fine Motion Control Rod Drive

NEDO-33954 REVISION 0
NON-PROPRIETARY INFORMATION

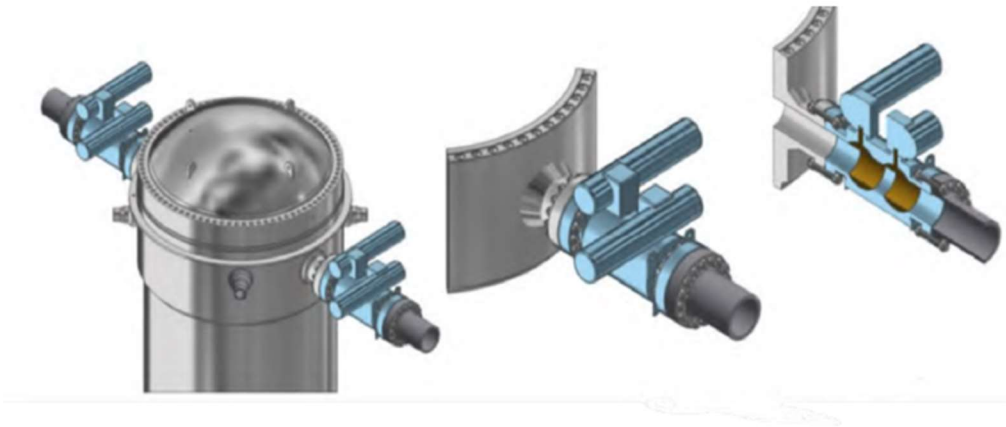


Figure 5.10-1: Reactor Pressure Vessel Isolation Valve Assembly (Example)

NEDO-33950 REVISION 2
NON-PROPRIETARY INFORMATION

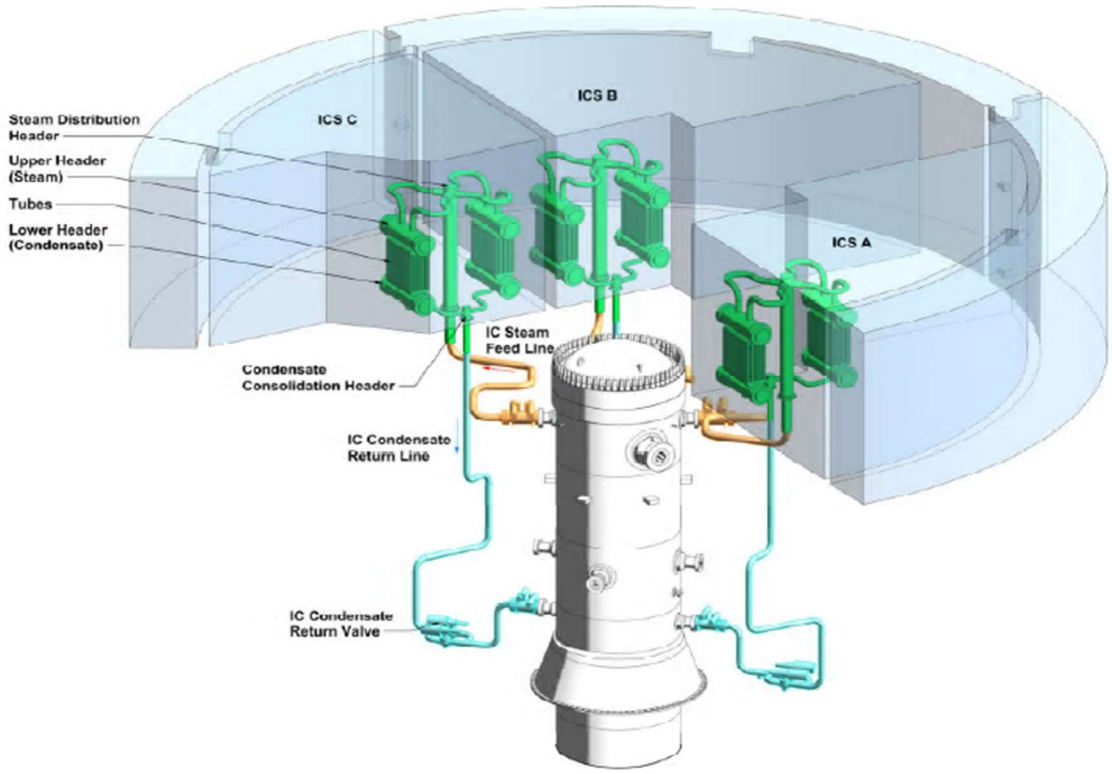


Figure 1.7-3: Isolation Condenser System

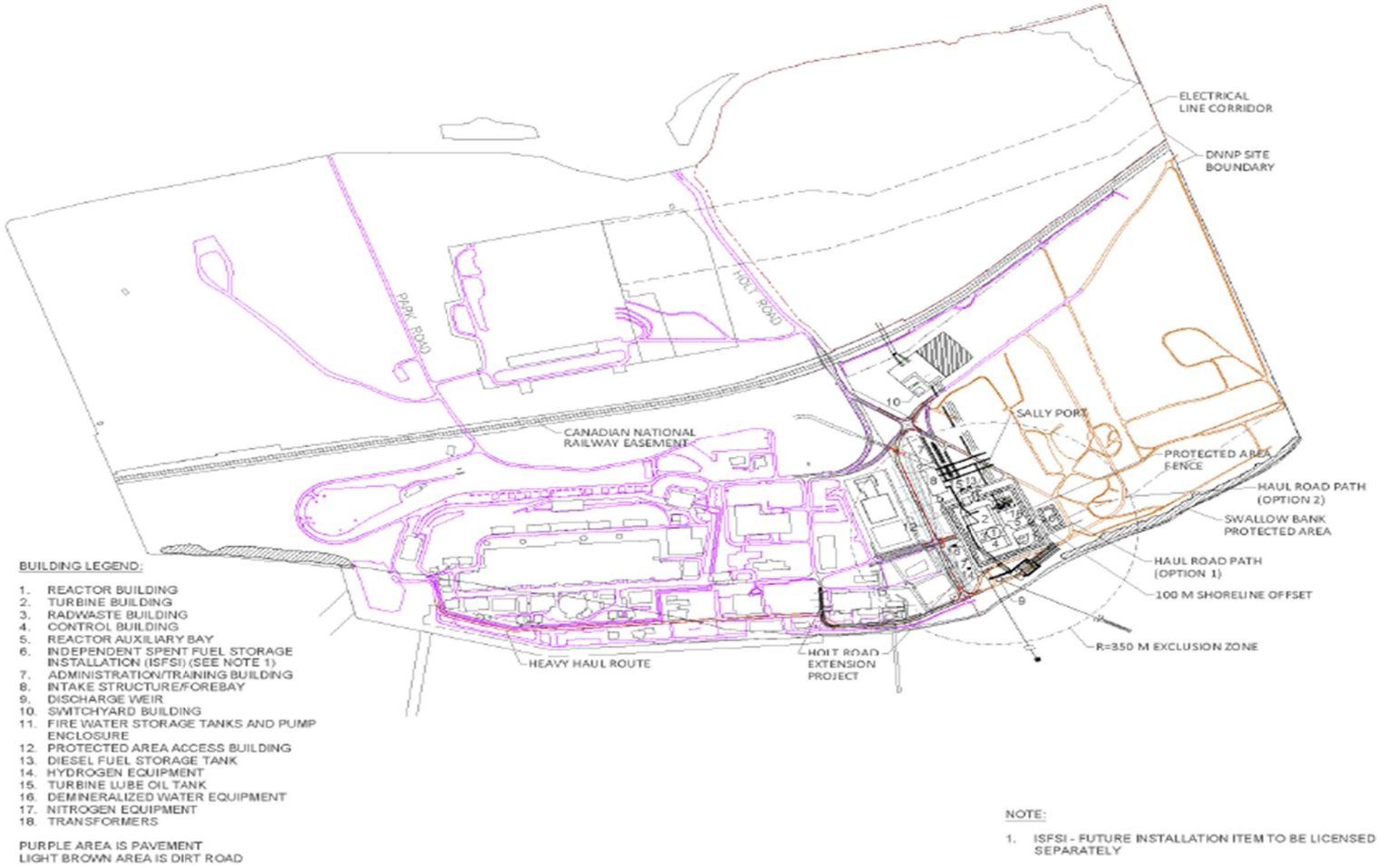
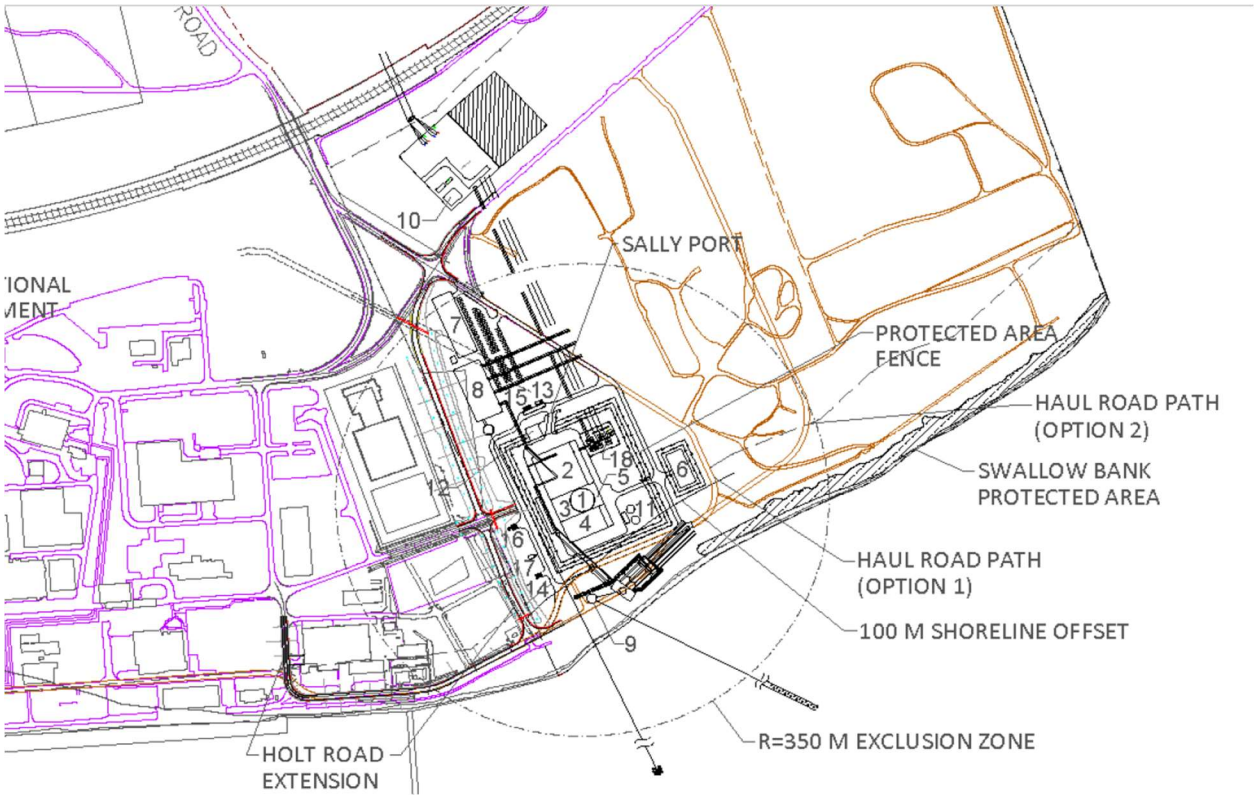


Figure A1.1-2: Darlington Nuclear Site (DNNP Proximity to DNGS)



BUILDING LEGEND:

1. REACTOR BUILDING
2. TURBINE BUILDING
3. RADWASTE BUILDING
4. CONTROL BUILDING
5. REACTOR AUXILIARY BAY
6. INDEPENDENT SPENT FUEL STORAGE INSTALLATION (ISFSI) (SEE NOTE 1)
7. ADMINISTRATION/TRAINING BUILDING
8. INTAKE STRUCTURE/FOREBAY
9. DISCHARGE WEIR
10. SWITCHYARD BUILDING
11. FIRE WATER STORAGE TANKS AND PUMP ENCLOSURE
12. PROTECTED AREA ACCESS BUILDING
13. DIESEL FUEL STORAGE TANK
14. HYDROGEN EQUIPMENT
15. TURBINE LUBE OIL TANK
16. DEMINERALIZED WATER EQUIPMENT
17. NITROGEN EQUIPMENT
18. TRANSFORMERS

PURPLE AREA IS PAVEMENT
LIGHT BROWN AREA IS DIRT ROAD

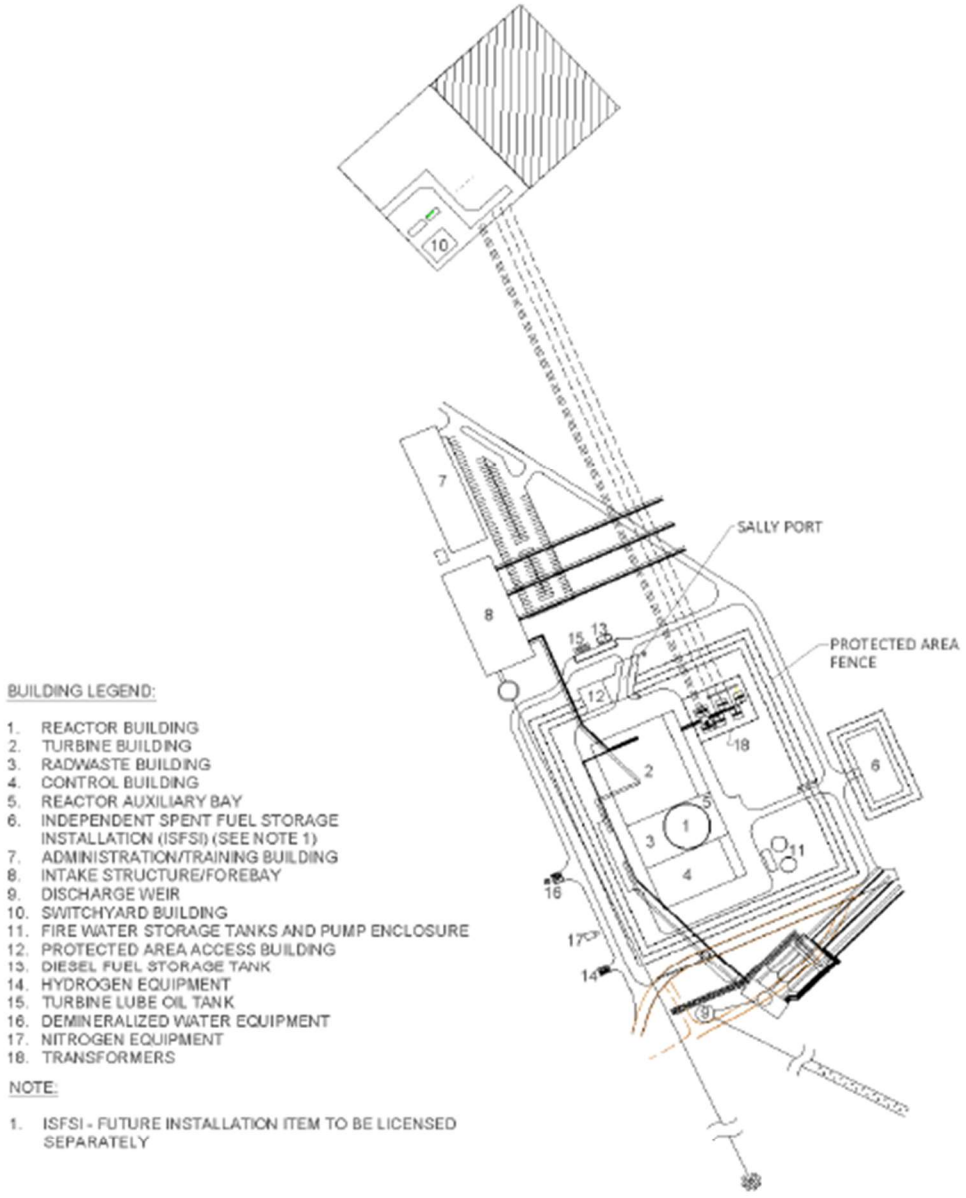


Figure A1.4-1: DNNP BWRX-300 Facility Site Layout

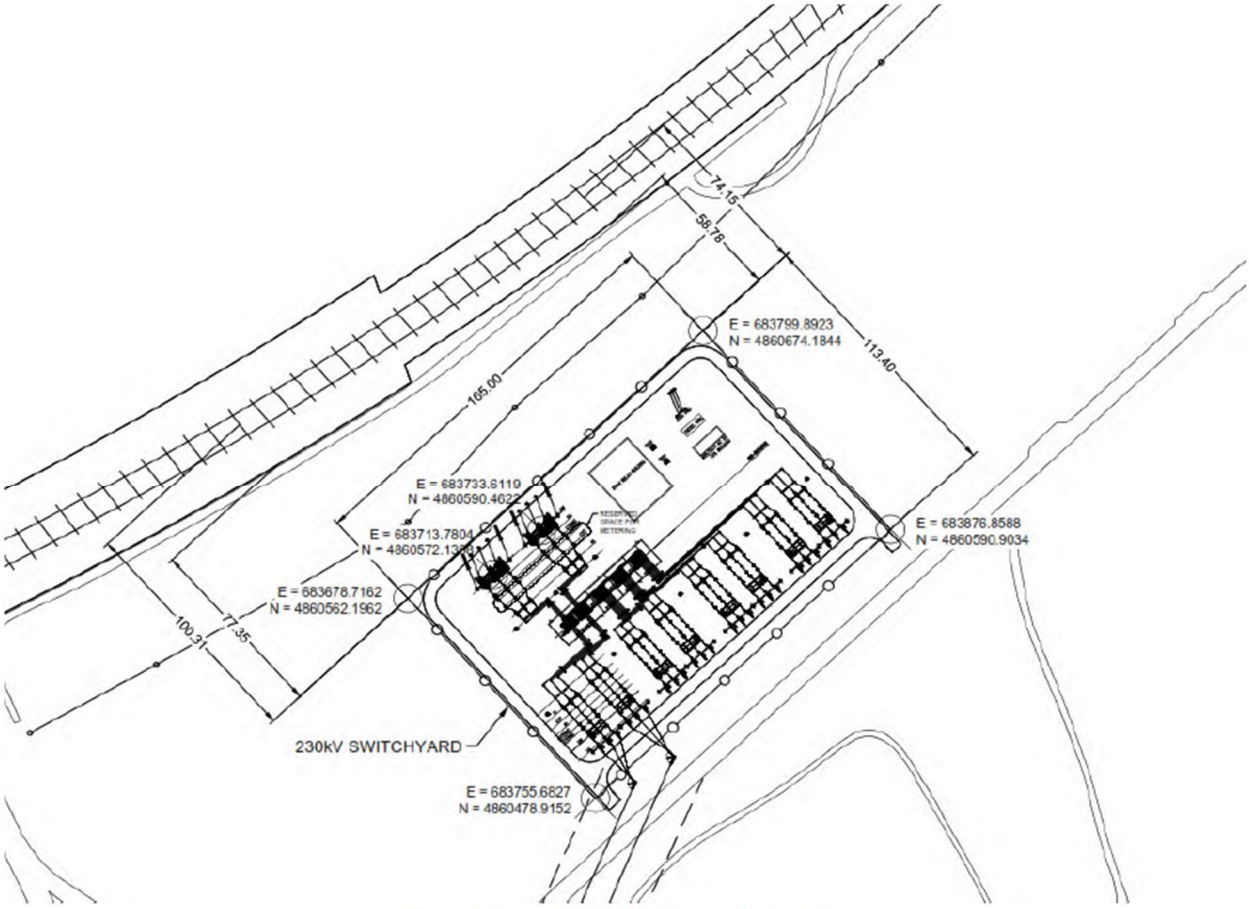


Figure A1.4-2: DNNP Switchyard Site Plan