PIR Center Conference

Nuclear Materials Protection, Control, and Accounting

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Background: MPC&A Upgrades

Material Protection, Control and Accounting (MPC&A) upgrades are typically grouped into three categories:

- ***Physical Protection*** upgrades address the detection of adversaries entering a facility, delaying access to target materials, and response by security forces. In addition, physical protection upgrades provide enhanced protection against sabotage.

- ***Material Control and Accounting*** upgrades address controlling personnel access to nuclear materials on site and establishing accurate inventories to protect against diversion by facility insiders.

- ***Transport Security*** upgrades address physical protection, material control and accounting during shipments on or off site.

MPC&A Principles

Protection in Depth: Ensure multiple layers of security to compensate for possible single component failure and increase complexity for the adversary.

Graded approach: Type of upgrades employed depends on attractiveness of nuclear material present.

Balanced protection: Provide protection against threats on all possible paths. Address scenarios involving both insiders and outsiders.

System sustainability: Select systems and equipment that recipient country is equipped to maintain over the long term.

Vulnerability Assessment: MPC&A systems are typically designed after comprehensive vulnerability assessments based on established methodologies.

U.S./R.F. MPC&A Program Structure

Working with FSU since mid 1990s.

1999 Bilateral MPC&A Agreement with Russia under Cooperative Threat Reduction (CTR) Agreement umbrella.

Typically DOE funds U.S. Laboratories, that in turn contract with Russian facilities, vendors.

Joint Coordination Committees established with Minatom, the Ministry of Defense, and GAN

Sites of MPC&A Cooperation

MinAtom Weapons Complex

1. Arzamas-16, Sarov, All-Russian Scientific Research Institute of Experimental Physics (VNIIEF)
2. Chelyabinsk-70, Snezhinsk, All-Russian Scientific Research Institute of Technical Physics (VNITF)
3. Chelyabinsk-65, Ozersk, Mayak Production Association
4. Sverdlovsk-44 (S-44), Ural's Electrochemical Integrated Plant (UEIP)
5. Tomsk-7, Siberian Chemical Combine (SCC)
6. Krasnoyarsk-26, Zheleznogorsk, Mining and Chemical Combine (MCC)
7. Krasnoyarsk-45, Zelenogorsk, Electrochemical Plant (ECP)
8. Avangard Electrochemical Plant
9. Sverdlovsk-45, Lesnoy
10. Penza-19, Zarechnyy
11. Zlatoust-36, Trekhgornyy

Russian Civilian Sites

12. Institute of Physics and Power Engineering (IPPE), Obninsk
13. Bochvar All-Russian Scientific Research Institute of Inorganic Materials (VNIINM)
14. Elektrostal Production Association Machine Building Plant (PDMZ)
15. Scientific Production Association Luch, Podolsk
16. Scientific Research Institute of Atomic Reactors (NIIAR), Dimitrovgrad
17. Novosibirsk Chemical Concentrates Plant (NCCP)
18. Khlopin Radium Institute (KRI)
19. Krylov Shipbuilding Research Institute
20. Petersburg Nuclear Physics Institute (PNPI)
21. Joint Institute of Nuclear Research (JINR), Dubna
22. Karpov Institute of Physical Chemistry
23. Moscow Institute of Theoretical and Experimental Physics (ITEP)
24. Moscow State Engineering Physics Institute (MIFI)
25. Scientific Research and Design Institute of Power Technology (RDIPE)
26. Lytkarino Research Institute of Scientific Instruments (NIIS)
27. Beloyarsk Nuclear Power Plant (BNPP)
28. Sverdlovsk Branch of Scientific Research and Design Institute of Power Technology (SF-NIKIET)
29. Tomsk Polytechnic University (TPU)

Naval Complex

Murmansk Vicinity

30. CSC A1
31. CSC A2
32. CSC A3
33. CSC A4
34. CSC A5
35. CSC A6
36. PSZ A1
37. CSC M1
38. CSC G2
39. PSZ B
40. CSC P1
50. CSC P2
51. CSC P2-2
52. CSC P2-3
53. CSC P3
54. CSC P3-2
45. CSC C1
46. CSC C2
47. CSC C3
48. PSZ C1
49. PSZ C2
45. PSZ-C3
48. CSC D1
47. CSC E1
49. PSZ E1
55. CSC P3-3
56. CSC P3-4
57. CSC P4
58. CSC P5
59. CSC P6
60. CSC P7

Vladivostok region

Petropavlovsk-Kamchatskiy region

61. CSC K1
62. CSC K2
63. CSC K3
64. CSC K3-2
65. CSC K3-3
66. CSC K3-4
67. CSC K4
68. CSC K5
69. CSC K6
70. PSZ K1
71. PSZ K2

72. Icebreaker Fleet, Murmansk
73. PM-12 Refueling Ship, Murmansk
74. PM-63 Refueling Ship, Severodvinsk
75. PM-74 Refueling Ship, Vladivostok
76. Navy Site 49, Murmansk
77. Navy Site 32, Vladivostok
78. Navy Site 34, Vladivostok
79. Navy Site 66, Vladivostok
80. Severnaya Shipyard
81. Sergiyev Posad
82. Kurchatov Institute

NIS and the Baltics

83. Salaspils Institute of Nuclear Physics, Latvia
84. Ignalina Nuclear Power Plant, Lithuania
85. GOSNIY Institute of Nuclear Power Engineering, Minsk, Belarus
86. Kiev Institute of Nuclear Research, Ukraine
87. Kharkiv Institute for Physics and Technology, Ukraine
88. South Ukraine Nuclear Power Plant
89. Sevastopol Institute for Nuclear Energy and Industry, Ukraine
90. Tbilisi Institute of Physics, Georgia
91. BN-350 Breeder Reactor, Aktau, Kazakhstan
92. Kurchatov Institute of Atomic Energy, Kazakhstan
93. Ulba Metallurgical Plant, Ust-Kamenogorsk, Kazakhstan
94. Institute of Atomic Energy, Alatau, Kazakhstan
95. Institute of Nuclear Physics, Tashkent, Uzbekistan

Second Line of Defense

Russia has 40,000 kilometers of border to protect against illicit nuclear material trafficking.

Russian Customs reports 95% of SNM seizures have been made because of the use of portal monitors and other radiation detectors.

Emphasis on stationary systems for detecting nuclear materials, with portable response instruments for localization and identification.

Upgraded Border Crossing

Radiological Threat Reduction

There are thousands of radiological sources and storage facilities worldwide that contain material attractive for use in a radiological dispersion device (RDD).

- Over 1,000 RTGs are scattered throughout remote parts of Russia and the former Soviet Union which need to be located, consolidated, and secured

DOE created a high level Task Force to focus attention on securing domestic and international radioactive sources.

DOE's response includes a bilateral effort with Russia, the Tripartite Initiative, and the Radiological Security Partnership

The DOE/NNSA Radiological Threat Reduction Task Force has secured 9 sites in Russia and the FSU

Coordination with G-8 is Essential

U.S. and other G-8 contributors working in parallel at some facilities.

Effective MPC&A is not a series of distinct activities – it is a system.

MPC&A systems are comprised of numerous integrated components:

- Detection systems
- Assessment systems
- Delay systems
- Communications systems
- Response systems

Training and procedures must address all critical components

All components are interdependent.

Progress to Date

Committed to finish upgrades by 2008. Congressional requirement to end assistance by 2013.

Work with RF Navy almost complete. Work with Strategic Rocket Forces proceeding rapidly. Kurchatov Institute to be completed later this year.

Minatom "civilian" sites nearing completion.

- Novosibirsk Chemical Concentrates Plant (NCCP), Institute of Physics and Power Engineering (IPPE), Lytkarino Research Institute of Scientific Instruments (RISI) to be completed next year.

Minatom "weapons" sites require more extensive assurance negotiations.

U.S. Priorities

Accelerate Completion of MPC&A Upgrades.

Intensify Sustainability & Oversight Projects – *e.g. MOM, MPC&A training, Minatom Self Inspection, GAN support, Personnel Reliability, etc.*

Shift to Greater Partnership – Joint Planning (JAP), Improved Communication.