February 19, 2009

Minutes of the Canadian Nuclear Safety Commission (CNSC) Meeting held Thursday, February 19, 2009, in the Public Hearing Room, CNSC Offices, 280 Slater Street, Ottawa, Ontario.

Present:

M. Binder, President
C.R. Barnes
A. Harvey
R. Barriault
D. Tolgyesi

M.A. Leblanc, Secretary
J. Lavoie, Senior General Counsel
S. Dimitrijevic, Recording Secretary

CNSC staff advisors were: P. Elder, A. Régimbald, S. Faille, G. Rzentkowski, M. Couture, P. Thompson and D. Howard

Other contributors were:

- Bruce Power: F. Saunders, B. Smyth and P. Chan
- Ontario Power Generation Inc. (OPG): B. Morrison and M. O'Neill
- Atomic Energy of Canada Limited (AECL): B. Pilkington and G. Dolinar
- Ontario Ministry of Environment (OMOE): R. Raeburn-Gibson
- CH2M Hill: B. Whiffin

Adoption of the Agenda

1. The revised agenda, CMD 09-M2.A, was adopted as presented.

Chair and Secretary

2. The President chaired the meeting of the Commission, assisted by M. A. Leblanc, Secretary and S. Dimitrijevic, Recording Secretary.

Constitution

3. With the revised notice of meeting, CMD 09-M1.A, having been properly given and a quorum of Commission Members being present, the meeting was declared to be properly constituted.

4. Since the meeting of the Commission held December 11, 2008, Commission Member Documents CMD 09-M1 to CMD 09-M9 were distributed to Members. These documents are further detailed in Annex A of these minutes.

Minutes of the CNSC Meeting Held December 11, 2009

5. The Commission Members approved the minutes of the December 11, 2008 Commission Meeting as outlined in CMD 09-M3.

STATUS REPORTS

Significant Development Report No. 2009-1

Nomad Inspection Services, Spencer Manufacturing and MDS Nordion

6. With reference to CMD 09-M9 regarding a notification on operational event, CNSC staff reported that MDS Nordion had received a package with a surface dose rate exceeding the regulatory limits. The event led to an overexposure to transport workers.

7. CNSC staff informed the Commission that it was investigating the cause of the event. CNSC staff will attempt to clarify the circumstances of the event and determine whether the issue was of procedural and training related nature, or an equipment problem. Also, CNSC staff will determine if any licensing regulatory action should be taken.

8. The Commission sought more information on the procedure applied by Nomad Inspection Services and Spencer Manufacturing, involved in packing and transferring the package, and asked if the involved personnel had been properly trained. CNSC staff responded that it was examining the safety procedures in place and the applied safety precautions. CNSC staff added that both companies are CNSC licensees, working with radiography material on a regular basis, and are frequently involved in transportation of radioactive material.

9. The Commission asked about the frequency of similar events. CNSC staff responded that this was the second event of the kind in the last two years.

10. The Commission further asked if the transport workers had been advised of their exposure to radiation. CNSC staff responded that the drivers and the transport company had been informed about the exposure above limits established for members of the public.

11. The Commission requested that the results of the investigation be presented at one of its future meetings. CNSC staff confirmed that it will report to the Commission upon completion of the root cause analysis, which is expected by the end of March 2009.

ACTION
by
April 2009

Status Report on Power Reactors

12. With reference to CMD 09-M4, which includes the Status Report on Power Reactors, CNSC staff presented information regarding the refurbishment activities at Point Lepreau Nuclear Generating Station (NGS) and related postponement of the Commission Hearing for fuel reload. CNSC staff also informed the Commission on a forced outage to repair a shutdown cooling leak at Pickering A NGS – Unit 1.

13. In addition to the information presented in CMD 09-M4, CNSC staff updated the Commission on the Bruce B – Unit 6 NGS status and two Pickering NGS units. The Bruce B unit went offline after a circuit tripped on the Hydro One transmission line, and Pickering A – Unit 4 and Pickering B – Unit 5 were in a planned outage.

14. In its update, CNSC staff added that the power of Pickering A – Units 1 and 4, was reduced to 92 and 96 percent of full power, respectively.

15. The Commission sought more information on fuelling machine unavailability that caused the Bruce A – Unit 4 to operate at reduced power. CNSC staff responded that the machine had been temporarily unavailable due to maintenance, and that the unit was back at full power.

Updates on items from previous Commission proceedings

16. With reference to CMD 09-M5, regarding the updates to items from previous Commission proceedings, CNSC staff informed the Commission on follow-ups on Bruce A NGS; proposed new Neutron Overpower Protection Methodology; Pickering A and B NGS; and SRBT status on meeting its financial commitments.

Bruce Power Inc.: Bruce A-Unit 3 Shutdown System 1 Trip

17. Following its commitment from the December 11, 2008 meeting, CNSC staff presented an update regarding the Bruce A-Unit 3 Shutdown System 1 (SDS1) trip. CNSC staff expected Bruce Power to complete the root-cause analysis by January 15, 2009; however, the final root-cause analysis has not been formally provided and CNSC staff has not reached its conclusion on the issue.

18. CNSC staff reported that it had reviewed the preliminary and detailed S-99 reports[1] submitted by Bruce Power. Since these documents did not provide sufficient information for CNSC staff to reach a conclusion on undertaken corrective actions, Bruce Power committed to complete a Resolution Category B Root Cause Investigation and to report this in an S-99 Additional Information Report. This additional report had not reached CNSC at the time of this meeting.

19. CNSC staff further reported that its site inspectors had conducted a reactive Type II compliance inspection. The inspection resulted in a recommendation and an action notice to Bruce Power. CNSC staff stated that a letter summarizing the findings of the inspection has been sent out on February 16, 2009, and that Bruce Power has been requested to respond within 60 days.

20. Bruce Power informed the Commission that the root-cause analysis had been completed by mid-December 2008, and approved by its Corrective Action Review Board, by January 9, 2009. Due to a procedural error, it has not been sent to CNSC, although it has been available to the site staff.

21. Bruce Power described the event and indicated that it has been caused by a human performance error. Bruce Power stated that this was a reoccurrence of an event that had happened at Bruce B in 2004, which points to a weakness in the company's corrective action review system that existed at that time.

22. The Commission asked if the same review system was still in use and what has been done for the prevention of similar errors to occur in the future. Bruce Power responded that it has corrected the identified weaknesses and that the personnel was retrained for all human performance events. Bruce Power added that it was reviewing the general employee training process.

23. The Commission further asked if the employees involved in the event had been checked for fitness for work. Bruce Power responded that all involved employees had been interviewed and found to be fit for work.

24. The Commission inquired if the experience of the event and lessons learned have been shared with other organisations. Bruce Power stated that this has been shared throughout the company, with shareholders, and with the rest of the industry. The public was informed through the company's website. CNSC staff added that in

[1] S-99 Preliminary Report, B-2008-21517, November 20,2008, and
S-99 Detailed Report, B-2008-21517, December 18, 2008

general, after reviewing an event and follow-up actions, the information is shared with other facilities in the industry, and through the international forums.

25. No further follow-ups to the Commission are expected on this matter.

Progress Report on the CNSC Staff Review of the OPG/BP New Neutron Overpower Protection Methodology

26. CNSC staff presented an update on its review of the new Neutron Overpower Protection (NOP) methodology, proposed by Ontario Power Generation (OPG) and Bruce Power. With this report CNSC staff is fulfilling its commitment made during the Public Hearings held in 2008 on the licence renewals for the Darlington NGS and for the Pickering B NGS.

27. CNSC staff has reviewed a new methodology for determination of trip set points (TSPs) for the reactor shutdown during a class of events involving a loss of control of the bulk power, or the spatial power distribution in a reactor. CNSC staff explained that this determination is a key component of any nuclear reactor safety case; it must cover a wide range of design basis accidents and demonstrate compliance with a set of safety limits.

28. CNSC staff noted that the proposed new methodology includes the effects of heat transport system ageing and addresses a number of issues that have been raised by the Commission over the years. The proposed methodology represents a significant departure from the current approach in its probabilistic treatment of the contributing factors and in its use of advanced statistical techniques.

29. CNSC staff stated that the main position of the proponents, OPG and Bruce Power, was that this new approach should remove unnecessary conservatisms that exist in the currently applied NOP methodology. CNSC staff also stated that the main objective of its review of the new NOP methodology was to confirm the adequacy and robustness of NOP and determined TSPs for loss-of-reactivity control events and the supporting compliance and monitoring program.

30. CNSC staff reported that, after reviewing the submitted proposal and supporting documents, it has concluded that an independent review of the probabilistic aspects of this methodology was required.

31. The proponents, OPG and Bruce Power, agreed to co-sponsor an independent third party review through an Independent Technical Panel (ITP). The primary deliverable of the expert review will be a report addressing the merits and adequacy of the proposed methodology. The ITP's final report is expected in May 2009, and the target date for the completion of CNSC staff's review of the new NOP methodology is the last quarter of 2009.

32. The Commission inquired on the composition of the ITP. CNSC staff responded that the ITP consists of international members and representatives from Canadian universities. CNSC staff added that consultants from the industry and representatives from CNSC staff would also participate in the work of the panel.

33. The Commission sought more information on the current situation with other power generating station. CNSC staff responded that New Brunswick Power Nuclear and Hydro-Quebec have adopted a different approach to deal with the issues of ageing and its influence on safety margins.

34. The Commission requested that the conclusions of the review be reported at a future Commission Meeting together with more detailed information on the impact of ageing on the operation of nuclear facilities and applied safety margins. — ACTION by winter of 2010

Ontario Power Generation Inc.: Pickering A and B 28-Element Fuel Bundle Issue

35. CNSC staff presented an update requested during the Public Hearing held in 2008 on the licence renewal for the Pickering B NGS. CNSC staff reported on its review of the safety analysis of the 28-element fuel bundle critical heat flux (CHF) experiments, performed by Stern Laboratories. The experiments have indicated that the dryout power of the 28-element fuel bundle, currently being used at the Pickering NGS, was significantly lower than expected.

36. CNSC staff and OPG provided more details on the role that CHF plays in the safety analyses for relatively high probability accident scenarios, and noted that CHF is used as an acceptance criterion to determine the effectiveness of the shutdown systems. The dryout power, determined by the CHF experiments, is closely related to overheating and fuel failure. The reactor shutdown system should trip the reactor in time to prevent CHF and fuel failures occurring anywhere in the reactor core.

37. As a consequence of the testing results, CNSC staff had requested that OPG take compensatory actions to account for the lowered dryout power and to restore safety margins and performance of the shutdown systems. In response, the operating power of Pickering A Units 1 and 4 has been reduced to 96% of the full power. CNSC staff noted that this interim corrective measure will be revisited once the dryout power issue is resolved.

38. CNSC staff stated that the prediction uncertainty in this case could not be rigorously derived due to the lack of sufficient number of simulated tests that would encompass all variables important to safety analyses. CNSC staff is of the opinion that resolution of these issues could be achieved by performing statistical analyses of the available CHF data to determine the prediction uncertainty.

39. CNSC staff added that it expects these issues to be resolved in the second quarter of 2009.

40. No further follow-ups to the Commission are expected on this matter.

SRB Technologies (Canada) Inc. (SRBT): SRBT Status on Meeting its Financial Commitments for the Period of December 11, 2008 to February 3, 2009

41. CNSC staff informed the Commission that SRBT is currently meeting its financial commitments.

INFORMATION ITEMS

Update Regarding Media Reports Dealing with Two Separate Leaks at the National Research Universal (NRU) Reactor

42. With reference to CMD 09-M7 and CMD 09-M7.1, CNSC staff and the Atomic Energy of Canada Limited (AECL) presented an update regarding media reports on two separate leaks at the NRU reactor at the Chalk River Laboratories (CRL). The leaks have triggered significant public interest regarding airborne emissions and effluent releases to the Ottawa River.

43. AECL informed the Commission on details of the leaks. The heavy water leak occurred on December 5, 2008, during preparations to bring the NRU out of a safe shutdown state. The event had been reported to CNSC and the shutdown had been extended to investigate the cause of the leak. During the investigation, the leak stopped and has not reoccurred since. It was estimated that about 47 kg of heavy water (out of the contained 68 000 kg) had leaked

from the reactor core. Heavy water was collected in the facility sump. A small portion of heavy water, estimated to be 4.5 kg, evaporated during its transfer to the sump. Evaporated water was drawn out of the building through NRU's ventilation system and released through a monitored stack. AECL stressed that the released amount did not pose an environmental risk.

44. AECL further informed the Commission that the second leak was an ongoing leak from the NRU reflector, filled with purified, ordinary water. That water has also been collected in the sump.

45. AECL added that the water collected in the sump was transferred to the CRL Waste Treatment Centre (WTC). The centre processes waste water to remove the majority of radionuclides, except for tritium. Cleaned water is released to the Ottawa River after being monitored. AECL noted that it routinely monitors water in the Ottawa River for a variety of hazardous substances, including tritium, to ensure public safety and environmental protection. The results of the measurements related to the leaks showed that the concentration of hazardous substances, including tritium, did not pose any risk to the public or the environment, and was several thousand times smaller than the regulatory limits called Derived Release Limits (DRLs).

46. AECL stated that, although the leaks had not affected the health and safety of the public, they had drawn significant media interest; therefore, recognizing this interest, AECL has decided to implement a system for proactive disclosure. AECL has started discussions with CNSC and other stakeholders to make public all Chalk River events.

47. CNSC staff provided more information on health and environmental impacts of the event, and put it in context with public reporting. CNSC staff emphasized that, from a reactor safety point of view, AECL had responded to the leaks in an appropriate manner following established policies and procedures.

48. CNSC staff reiterated that DRLs are established to provide assurance that no member of the public will receive a dose above the Canadian and international limit of one millisievert per year (1mSv/year). CNSC staff added that it requires that all licensees apply a further barrier of protection; consequently, action levels are established so that a prompt action can be taken well before a regulatory limit is reached.

49. Bringing the current event in the context of regulatory limits, CNSC staff noted that the total amount of tritium released in the atmosphere was 0.0068 percent of the regulatory limit. The corresponding radiation dose to the public is 10 000 times smaller than the annual dose limit for the airborne releases. Compared with the Canadian and international limit of 1000 microsieverts per year (1000μSv/year = 1mSv/year), the radiation dose associated with the NRU event is estimated at 0.13 μSv from the airborne releases and less than 0.1 μSv from the discharge of tritium into the Ottawa River. CNSC staff stated that these doses are a small fraction of the public dose limit and do not represent any sort of public health risk.

50. With respect to public reporting, CNSC staff explained the most commonly used international scheme called the International Nuclear Event Scale (INES). Introduced by the Organisation for Economic Co-operation and Development - Nuclear Energy Agency and the International Atomic Energy Agency, the scale is used to promptly communicate to the public the safety significance of nuclear and radiological events. The INES is a seven-level scale where the lower levels, 1 to 3, are termed “incidents” and the upper levels, 4 to 7, are attributed to “accidents”. The scale is designed so that the severity of an event is about ten times greater for each increase in level on the scale. Events without safety significance are called “deviations” and are classified “below scale” or as “level 0”. The NRU event in December 2008 is rated at level 0 on this scale.

51. CNSC staff added that it has criteria for public reporting through the Significant Development Reports (SDRs) to the Commission, which are stricter than those used in the INES scale. While there were no events of level 1 or above on the INES scale in Canada in 2008, a number of events were reported to the Commission, at its meetings, as SDRs.

52. CNSC staff noted that it has initiated discussions with all licensees about changes to reporting requirements so to include some type of proactive disclosure for the power reactors and large research reactors.

53. The Commission asked how long it takes to detect a leak. AECL responded that, depending on the position and magnitude of the leak, it could take from minutes to hours for it to become apparent.

54. The Commission further asked if the cause of the leak had been detected and the probability for it to reoccur. AECL responded that the evidence collected during the investigation indicate that the heavy water leak had come from the upper seal of the reactor vessel. AECL noted that some uncertainty still remains, since the

leak had stopped during the testing and did not reoccur. AECL has continued to analyse all data in order to identify necessary corrective measures.

55. The Commission inquired about the leak from the reflector. AECL responded that repairs have been done and the ongoing leak was reduced to 25% of the previous amount.

56. In response to the Commission's request to comment on the AECL's efforts to resolve the issue, CNSC staff stated that it expects that AECL come up with a plan to continue to search for potential sources of the leak. CNSC staff added that it will continue to monitor the situation.

57. The Commission stressed the importance of public perception of the safety issues related to the operation of the NRU and sought more information on measures taken by AECL and CNSC staff to further improve communication with the public. AECL responded that it will take this event as a learning opportunity. AECL added that it has started to consult with the stakeholders to identify the types of information that it needs to communicate. CNSC staff added that it recognizes the need to improve its communication of low-risk events to the public.

58. The Commission sought more information about the ageing of the NRU and potential impact on its safe operation. AECL responded that the NRU is operated safely and within all regulatory requirements. AECL stated that it invests significantly to keep up with the ageing process and to maintain the reliability and safety of NRU's operation.

59. The Commission inquired about the health hazard related to low doses of tritium and the scientific basis for regulating this matter. CNSC staff responded that, since the most significant risks are related to cancer, the adopted approach is similar to that applied for chemical carcinogens; it is considered that there is risk even at very low exposures. CNSC staff added that the adopted standards are based on a large amount of epidemiological data collected over decades and on best international science. The accepted public dose limit of 1mSv is a very prudent one; it is 100 times below levels that have been shown to cause health effects.

60. The Commission expressed its opinion that effective information on the real dimensions of the event, presented promptly to the public, could significantly improve public opinion on the safety aspects of the NRU operation. To achieve this goal, the involved agencies would have to be more proactive in communicating the complexity of issues and explaining precisely their impact on the environment, health and safety.

61. No further updates to the Commission are expected on this matter.

Ontario Ministry of Environment – Deloro Mine Site: Status Update on the Environmental Assessment and Detailed Project Management Plan

62. With reference to CMD 09-M6 and CMD 09-M6.1, CNSC staff and the Ontario Ministry of Environment (OMOE) presented an update on the status of the environmental assessment (EA) for the period of December 2007 to December 2008 and a detailed project management plan for the Deloro Mine Site.

63. At the Commission Meeting held on December 6, 2007, the Commission granted an extension to OMOE's temporary exemption for a licence to possess, manage and store nuclear substances at the Deloro Mine Site until December 31, 2009. The exemption was granted to OMOE in order to allow time to complete the EA and licensing process. With this decision, the Commission requested that OMOE submit a detailed status report and a detailed project management plan at a public proceeding by the end of 2008.

64. OMOE informed the Commission that the Deloro Mine Site Cleanup Project is an initiative of the OMOE on behalf of the Ontario Government, to cleanup the abandoned mining, refining and manufacturing site at Deloro, Ontario.

65. OMOE reported that the operations had been shut down in 1961, after a long period of gold mining and refining, production of arsenical pesticides, and production of cobalt, nickel, silver and stellite. After this intensive industrial activity, large amounts of hazardous by-products and residues have remained on the property. The Ministry assumed responsibility for this site in 1979, when the site owner failed to comply with the Ministry's order to stop the pollution.

66. OMOE further reported that the main contaminants at the site are arsenic and low-level radioactive slag and tailings produced as a result of the processing of by-products from uranium refining. This radioactive material represents six percent of the waste at the site.

67. In its status update, OMOE informed the Commission on the Environmental Assessment Study Report (EASR), preparations for the Waste Nuclear Substance Licence (WNSL) application, and on the concurrent Stage 1 Planning and Ongoing Site Operations.

68. With respect to the EASR, OMOE stated that eight federal, provincial and municipal agencies had provided their review comments on the EASR. Based on these comments and additionally performed studies, the EASR was edited and re-submitted to CNSC in December 2008.

69. OMOE informed the Commission on its preparations to submit its WNSL application and stated that the secondary documents for this application were 50 per cent completed.

70. In addition to this update, the Ministry presented a project management plan and briefed the Commission on the status of related activities. The Ministry reported that the investigative studies and site assessment, alternative approaches to remediate the site, and cleanup plan are completed, while the licensing activities and development of detailed engineering designs are in progress.

71. CNSC staff informed the Commission that it has been reviewing the revised EASR. CNSC staff expected to complete a Draft EA Screening Report by the end of March 2009, and to submit its recommendation on the EA Screening Report to the Commission by June 2009.

ACTION
by
September
2009

72. CNSC staff reported that the last of its annual site visits had been conducted in September 2008, and that there were no issues of immediate concern at the site.

73. CNSC staff added that, during this report period, there had been no interest from the public or media concerning the Deloro Mine Site outside of that generated through the EA process.

74. The Commission asked about the anticipated total cost of the project. OMOE responded that $ 26 million had been spent and the remaining clean-up would require between $ 45 million and $ 55 million.

75. The Commission sought more information on groundwater contamination and its potential impact on the Moira River. CNSC staff responded that groundwater and surface water runoff could contaminate the river. OMOE noted that surface water and the Moira River have been monitored for radioactivity, and that the measured activity did not show values above the standard levels.

76. The Commission inquired on the period after the site restoration and on the final end-state of the site. OMOE responded that it has no plans to remove material from the site and that it was not looking for a steady state or a no-contaminant situation in the foreseeable future. However, the site will be permanently monitored. CNSC staff added that, for now, there is no identified end-state objective for decommissioning of the site.

77. The Commission expressed its appreciation for the successful coordination of this project.

DECISION ITEMS - REGULATORY DOCUMENTS

Regulations Amending the *Class II Nuclear Facilities and Prescribed Equipment Regulations – Radiation Safety Officer Certification*

78. With reference to CMD 09-M8, CNSC staff submitted to the Commission its recommendation in a protected document, which has been considered in a closed session.

79. After considering the recommendations submitted by CNSC staff, the Commission has approved the draft document *Regulations Amending the Class II Nuclear Facilities and Prescribed Equipment Regulations – Radiation Safety Officer Certification*, for pre-publication in the Canada Gazette, Part I. **DECISION**

80. With this decision, the Commission will consider, as an interim measure, amending all existing Class II licences to add a condition requiring the licensees to designate a CNSC approved radiation safety officer. The Commission will provide the licensees with an opportunity to be heard on this matter in a separate Commission proceeding.

Closure of the Public Meeting

81. The public portion of the meeting closed on February 19, 2009, at 2:21 p.m.

Secretary

Recording Secretary

APPENDIX A

CMD	DATE	File No

09-M1 2008-12-16 (6.02.01)
Notice of Meeting of January 14, 2009

09-M1.A 2008-12-22 (6.02.01)
Revised Notice of Meeting of February 19, 2009

09-M2 2009-02-05 (6.02.02)
Agenda of the meeting of the Canadian Nuclear Safety Commission to be held on Thursday, February 19, 2009, in the Public Hearing Room, 14th floor, 280 Slater Street, Ottawa, Ontario

09-M2.A 2009-02-12 (6.02.02)
Updated agenda of the meeting of the Canadian Nuclear Safety Commission to be held on Thursday, February 19, 2009, in the Public Hearing Room, 14th floor, 280 Slater Street, Ottawa, Ontario

09-M3 2009-02-10 (6.02.03)
Approval of Minutes of Commission Meeting held February 19, 2009

09-M4 2009-02-03 (6.02.04)
Status Report on Power Reactors Units as of February 3, 2009

09-M5 2009-02-03 (6.02.04)
Updates on items from previous Commission proceedings

09-M6 2009-02-03 (6.02.04)
Ontario Ministry of Environment – Deloro Mine Site: Status update on the environmental assessment during the period from December 2007 to December 2008, and a detailed project management plan – Oral presentation by CNSC staff

09-M6.1 2009-02-03 (6.02.04)
Ontario Ministry of Environment – Deloro Mine Site: Status update on the environmental assessment during the period from December 2007 to December 2008, and a detailed project management plan – Oral presentation by the Ontario Ministry of the Environment

09-M6.1A 2009-02-11 (6.02.04)
Ontario Ministry of Environment – Deloro Mine Site: Status update on the environmental assessment during the period from December 2007 to December 2008, and a detailed project management plan – Oral presentation by the Ontario Ministry of the Environment – Supplementary Information

09-M7 2009-02-09 (6.02.04)
Atomic Energy of Canada Limited: Update regarding media reports dealing with two separate leaks at the National Research Universal (NRU) research reactor – Oral presentation by CNSC staff

09-M7.1 2009-02-09 (6.02.04)
Atomic Energy of Canada Limited: Update regarding media reports dealing with two separate leaks at the National Research Universal (NRU) research reactor – Oral presentation by Atomic Energy of Canada Limited

09-M8 2009-01-30 (6.02.04)
Regulations Amending the *Class II Nuclear Facilities and Prescribed Equipment Regulations – Radiation Safety Officer Certification* – Contains Cabinet Confidence documents and is not publicly available

09-M9 2009-02-03 (6.02.04)
Significant Development Report no. 2009-1 for the period of December 4, 2008 to February 3, 2009