Canadian Nuclear Safety Commission

Commission canadienne de sûreté nucléaire

Record of Proceedings, Including Reasons for Decision and Order

In the Matter of

Party Subject to Order	Canadian Sub-Surface Energy Services Inc.
Subject	Opportunity to be Heard on the Designated Officer Order Issued to Canadian Sub-Surface Energy Services Inc. on August 31, 2009
Hearing Date	October 21, 2009

Canada

RECORD OF PROCEEDINGS

Party Subject to Order:	Canadian Sub-Surface Energy Services Inc.
Address/Location:	Suite 600, 505- 8th Avenue S.W., Calgary, Alberta, T2P 1G2
Purpose:	Opportunity to be heard on the Designated Officer Order issued to Canadian Sub-Surface Energy Services Inc. on August 31, 2009
Order Issued:	August 31, 2009
Date of hearing:	October 21, 2009
Location:	Canadian Nuclear Safety Commission (CNSC) Public Hearing Room, 280 Slater St., 14th. Floor, Ottawa, Ontario
Members present:	M. Binder, Chair
Secretary:	M.A. Leblanc
Recording Secretary:	P.Reinhardt
Counsel:	M. James

Applicant Represented By	**Document Number**
• B. Gabel. President • J. C. Prowse, Legal Counsel, Prowse Chowne LLP	CMD 09-H128.1 CMD 09-H128.1A CMD 09-H128.1B
CNSC staff	**Document Number**
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Designated Officer Order: Replaced by Commission Order

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Introduction

1. On August 31, 2009, a Canadian Nuclear Safety Commission[1] (CNSC) Designated Officer issued an Order to Canadian Sub-Surface Energy Services Inc. (Canadian Sub-Surface) as a result of an investigation performed by CNSC staff. The investigation focused on an incident where a Nuclear Energy Worker (NEW) of the licensee failed to properly transport and store a 2.0 Ci (74 GBq) Cs -137 source used in gas and oil logging. The Order required Canadian Sub-Surface to immediately comply with specific actions and measures identified in the Order. Among other actions and measures, the Order required that Canadian Sub-Surface perform an inventory of nuclear substances in its possession under CNSC Licence 12813-1-09.4 and restricted the licensed activities to possession and storage only.

2. Pursuant to subsection 37(6) of the *Nuclear Safety and Control Act*[2] (NSCA), the Designated Officer referred the Order to the Commission for review.

3. Pursuant to paragraph 40(1)(d) of the NSCA, the Commission provided an opportunity to be heard to Canadian Sub-Surface, as the person subject to and named in the Order.

4. This *Record of Proceedings* describes the Commission's consideration of Canadian Sub-Surface's submission on the Order, the review of the Order and the reasons for the decision.

Issue

5. In its review of the Order, the Commission was required to confirm, amend, revoke or replace the Order, pursuant to subsection 37(6) of the NSCA.

Proceeding

6. Pursuant to section 22 of the NSCA, the President of the Commission established a Panel of the Commission to review the Order. The Commission, in making its decision, considered information presented for a proceeding held on October 21, 2009 in Ottawa, Ontario. The proceeding was conducted in accordance with the *Canadian Nuclear Safety Commission Rules of Procedure*[3]. The Commission considered the Designated Officer Order, including information referred to in the Order, and received written submissions and heard oral presentations from CNSC staff (CMD 09-H128 and CMD H128.A) and Canadian Sub-Surface (CMD 09-H1128.1 and CMD 09-H1128.1A).

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[1] The *Canadian Nuclear Safety Commission* is referred to as the "CNSC" when referring to the organization and its staff in general, and as the "Commission" when referring to the tribunal component.
[2] Statutes of Canada (S.C.) 1997, chapter 9.
[3] Statutory Orders and Regulations (S.O.R.)/2000-211.

Decision

7. Based on its consideration of the matter, as described in more detail in the following sections of this *Record of Proceedings,*

> the Commission pursuant to paragraph 40(1)(d) of the Nuclear Safety and Control Act, first amended, in an interim decision, the Order issued on August 31, 2009 by the Designated Officer to the licensee by suspending its applicability for the period between October 22 to November 30, 2009, unless revoked or further amended prior to that date. The Commission, in a final decision rendered on November 30, 2009, revoked the Designated Officer Order issued to Canadian Sub-Surface Energy Services Inc.

8. The Order amended on October 21, 2009 allowed the resumption of the operations of the licensee for the stated period and allowed CNSC staff to conduct a follow-up inspection. The Commission rendered a final decision on November 30, 2009 following the receipt of a written report from CNSC staff on the result of the follow-up inspection.

9. As part of its decision to revoke the Designated Officer Order, the Commission requests that Canadian Sub-Surface provide :

- by December 31, 2009, an update regarding the status of "open" action items identified in the October 28, 2009 CNSC inspection and the measures taken to address CNSC findings during the Inspection interview identified in paragraph 38 below;
- by December 31, 2009, all details pertaining to the encapsulation of the Can-Sub Cs-137 sources and Type A shielded container modifications identified during the August 2009 CNSC Investigation; and
- by January 31, 2010, the confirmation of the radiation doses received by Nuclear Energy Workers who reported to have lost their personal dosimeters in 2009.

Issues and Commission Findings

10. In reviewing the Order under subsection 37(6) of the NSCA, the Commission considered the reasonableness of the Order. In this regard, the Commission considered the actions and measures identified in the Order and the information on which the Order was based, as identified in the Order. As elaborated further below, the Commission is satisfied that the Designated Officer, based on the information available, had sufficient evidence and a reasonable basis for issuing an Order.

Background

11. Canadian Sub-Surface currently holds CNSC licence No. 12813-1-09.4 that authorises the licensee to conduct well logging operations using nuclear substances throughout Canada.

12. On August 18, 2009, a CNSC Duty Officer was contacted by the Radiation Safety Officer (RSO) of the licensee reporting an incident that involved the possible overexposure of a Nuclear Energy Worker (NEW). The incident took place on August 13 and 14, 2009 at a location near Goodlands, Manitoba, where the licensee was performing well logging services. The RSO reported that on August 13, 2009, the NEW neglected to return a 2 Ci Cs-137 source to its Type A shielding container after completing the logging work that day. The source remained unshielded for approximately 20 hours. Due to potential radiation exposure to the worker, the licensee restricted the worker from handling radioactive material until his dosimetry results were made available to the licensee to estimate the dose of exposure.

13. On August 19, 2009, CNSC Operations Inspection Division inspectors based in the Calgary Regional Office visited the licensee's facility in Red Deer to investigate the incident and to determine the potential radiation dose received by the worker. CNSC inspectors also wanted to collect additional details regarding the incident to determine if all applicable requirements under the *Nuclear Safety and Control Act* (NSCA), its regulations and licence conditions had been adhered to. The inspectors interviewed Mr. Roger Milette (RSO) and Mr. Brian Brown (V.P. of Health, Safety and Environment), representatives of the licensee.

14. CNSC inspectors examined the equipment involved in the incident and collected information on the potential exposure dose. The inspectors found that the Type A shielding container involved in the incident had been originally designed to shield and hold a 5 Ci source of Cs-137, thereby limiting the dose rate at the surface of the container to 1.5mSv/h. Nonetheless, the dose rate measured at the surface of the container was as high as 2.59 mSv/h, even with a 2 Ci Cs-137 source inside. The CNSC inspectors further discovered that a significant quantity of shielding had been removed from the Type A shielding container.

15. Following a CNSC inspection on August 20, 2009, Mr. Brad Gabel, President of Canadian Sub-Surface, informed CNSC staff that the company would voluntarily shutdown its operations until it could complete its assessment of the event and implement necessary training.

16. On August 24, 2009, CNSC inspectors returned to the Red Deer facility and interviewed the worker involved in the incident in the presence of his lawyer. The worker stated that he had not secured the Cs-137 source within the Type A shielding container provided for that purpose and that he failed to wear the personal dosimeter provided to him by the licensee. The worker further added that he had transported the

unshielded source in an unsafe manner to and from the motel where he had stayed overnight and that he had not realised it did so until the following day. CNSC staff concluded that the worker did not follow the work practices and procedures established by the licensee under the licence.

17. On August 27, 2009 the CNSC inspectors met with licensee officials Mr. Roger Milette, Mr. Brian Brown, Mr. Lorne Hyvonen (acting RSO) and Mr. Troy Simoneau, the Chief Operating Officer who is also the licensee authority. CNSC inspectors enquired about the two Cs-137 sources that had been acquired in December 2008, and the Type A shielding containers in which they were transported. One of the source was the subject of the incident in Manitoba.

18. The licensee representatives claimed that, after their purchase, both Cs-137 sources had been encapsulated by a service provider based in Alberta. The CNSC inspectors contacted the identified service provider who denied in a written confirmation having performed such servicing work. CNSC inspectors noted that there is no company in Canada licensed to perform this type of servicing operation. CNSC inspectors requested from the licensee the documentation on the servicing work. The licensee did not provide the requested documentation. In addition, the licensee representatives were not able to provide information as to who, when, or how the modifications to the Type A shielding container had been performed to accommodate these modified sources.

19. In addition to the non-compliant encapsulation of the sources, the CNSC investigation revealed that the cover on the truck used by the licensee worker to transport equipment could not close because of the excess amount of equipment transported for the job and that the truck alarm system was broken.

20. CNSC inspectors revealed two more non-compliance issues:

- Modifications made to the Type A shielding containers and the sources not authorized under CNSC licence No. 12813-1-09.4 resulting in compromise in the shielding, hence compromising safety of workers, the public and the environment.
- Provision by the licensee of misrepresentative information to the CNSC inspectors regarding the further encapsulation of the sources.

The CNSC inspector, as a result of these findings, verbally Ordered the licensee to cease operational use of all nuclear substances and to cease transporting or transferring nuclear substances.

21. During CNSC inspectors visit to the licensee, on August 27, 2009, a second interview of the worker involved in the incident was conducted and the worker revealed that he had been terminated by the licensee and disclosed to the inspectors that when he had manoeuvred the logging tool he had dropped the source and had picked it up with his bare hand to put it back into the Type A shielding container. Based on the measurements taken by the inspectors and the new information provided by the worker, specialists within the Radiation Protection Division of the CNSC estimated that the

worker received an extremity dose of 38mSv, which is below the regulatory annual limit of 500 mSv for skin and extremity for one-year dosimetry period, and a whole body dose of no more than 20mSv, again below the regulatory annual limit of 50 mSv for a NEW. CNSC staff noted that the dose received by the NEW cannot be ascertained with precision as the worker was not wearing his personal dosimeter during the incident.

22. CNSC staff inspectors noted three more non-compliance issues as follow:

- Lack of effective radiation safety training provided to the worker;
- Lack of licensee management control over work practices and procedures to be followed by the workers; and
- Failure to report the incident immediately to the CNSC as required pursuant to subsection 29(1) of the *General Nuclear Safety and Control Regulations*[4] (the worker involved in the incident notified the licensee's management on August 15, 2009; the licensee did not notify the CNSC until August 18, 2009).

23. On August 31, 2009, a Designated Officer Order was issued to the licensee, superseding the verbal Order of the inspector, which required the licensee to cease all operations authorized under CNSC licence #12813-1-09.4. The justification for the Designated Officer Order was the confirmation by CNSC staff that the licensee was in possession of modified sources and Type A shielding containers that posed a risk to workers, the public and the environment. CNSC staff included in the Order the following required corrective measures:

- Train the workers on the licensee work and practices and procedures and on the CNSC *Packaging and Transport of Nuclear Substances Regulations*[5];
- Replace the Type A shielding containers in the licensee's possession to conform to the requirements of the CNSC *Packaging and Transport of Nuclear Substances Regulations*; and
- Commit to perform systematic analyses of any future incidents in Order to determine the incident root cause.

Dose determination for other workers on site

24. CNSC inspectors interviewed, on September 1, 2009, three workers of Technicoil and two consultants who were on site at the time of the incident to collect the necessary information to complete the dose estimation to members of the public. The interviews were used to estimate the radiation dose that these workers, who are considered members of the public, could have been exposed to. CNSC staff had determined through interviewing the licensee's worker that he required the assistance of others to manipulate the logging tool containing the source into the well. Based on the

[4] *General Nuclear Safety and Control Regulations*, Statutory Orders and Regulations (S.O.R)/2000-202.
[5] *Packaging and Transport of Nuclear Substances Regulations* Statutory Orders and Regulations (S.O.R..)/2000-208)

calculations and interviews, CNSC Radiation Protection Division staff estimated that two of the workers on site could have received a dose of 2.97 mSv and 2.24 mSv respectively, both of which are greater than the public dose limit of 1 mSv.

Report from Licensee

25. On September 3, 2009, CNSC staff received an incident report from the licensee as required under subsection 29 (2) of the General Nuclear Safety and Control Regulations. The licensee listed the probable causes of the incident as follows:

- Improper handling, packaging and transport of a radioactive sealed source (2 Ci Cs-137) used for well logging operations.
- The worker failed to follow standard operating procedures under the licence.
- The worker failed to ensure the sealed source was secured in the Type A shielding container prior to transport.
- A radiation meter was not used to check radiation readings on the Type A shielding container prior to leaving the location and documenting the measurement on the transport manifest provided.
- Improper pre-job planning; the worker did not allow himself sufficient time for travel and to properly prepare for the job (gather tools and ensure proper operation). The shortage of time contributed to the worker arriving late at the job site and his equipment failed to work properly, thus creating stress at the job site and lack of attention to detail while performing his tasks.

26. CNSC staff reviewed the licensee's report and noted the following findings:

- The licensee did not provide an explanation with respect to the unauthorized servicing performed to encapsulate the sources.
- The licensee did not provide an explanation as to how and by whom the Type A shielding containers had been modified. The report ignored the fact that two Type A shielding containers had been modified to accommodate the increased source size and that the containers no longer had the necessary level of shielding provided for in their original design.
- The licensee did not perform an assessment of the radiation exposure to other workers (who are members of the public) at the job sites and at the motel.
- The licensee did not provide information regarding the training received by the worker involved in the incident, specifically training in respect of the Transportation of Dangerous Goods Regulations, nor the worker's fitness for duty on August 13 and 14, 2009.
- The licensee did not provide an explanation concerning deficiencies with respect to the dosimetry program associated with the worker involved in the incident and the location of the worker's personal dosimeter during the incident.
- The licensee did not provide an explanation as to the reason why the incident was not reported immediately to the CNSC.

27. When the Designated Officer Order was issued, it was suggested by the Designated Officer to Mr. Brad Gabel, the President of Canadian Sub-Surface, that an action plan be prepared and submitted to the CNSC based on their investigation with specific timelines to implement any corrective actions that they identified. The action plan could have formed a basis to amend, revoke, or replace the Order.

28.

Actions and Measures of the Order

Canadian Sub-Surface was Ordered to undertake several actions and measures. Canadian Sub-Surface was required to:

- Immediately cease operational use of all nuclear substances in its possession or under its care or control;
- Immediately conduct a written inventory of the nuclear substances in its possession or under its care or control and provide the results of that inventory the Designated Officer (D.O.) or to a person authorized by the D.O.
- Immediately refrain from the transportation or transfer of any nuclear substance in its possession or under its care or control; and
- Import or export any nuclear substance.

Application of the Licensee to amend the Order

29. Canadian Sub-Surface indicated that it is directly affected by the Order because it had to cease all operations related to nuclear substances at its four operational locations where 92 radiation workers are employed. The licensee also claimed that the Order do not contain either time limits or means of compliance.

30. Canadian Sub-Surface also stated that:

- The Order is not consistent with Regulatory Guide G-273[6], and is therefore confusing particularly since the guide was referenced in the letter accompanying the Order;
- The Order contains no opportunity for satisfaction or fulfillment of the issues giving rise to the Order, nor closure of the Order, except that the licensee is permanently out of business;
- There is no direction in the Order with which the licensee could comply to allow operations at any of its locations as described in section 4.3 of the Regulatory Guide G-273;
- Prior to the issuance of the Order, senior management of the corporation became aware of the matters addressed in the Order, and had already advised the Designated Officer that the corporation had voluntary ceased operations until the issues could be properly addressed, and had also taken

[6] CNSC Regulatory Document G-273 Making, Reviewing and Receiving Orders under the Nuclear Safety and Control Act , May 2003

the modified containers out of service and Ordered new containers. Therefore, there was really no need for the Order;
- The Order amounts to a revocation of Canadian Sub-Surface's licence; and
- The Order is excessive in the circumstances.

31. Canadian Sub-Surface's requested that the Commission amend the Order and the preambles of the Order to more accurately reflect the facts. Canadian Sub-Surface requested the following amendments:
    - Canadian Sub-Surface shall immediately cease the use of the modified shipping containers; and
    - Canadian Sub-Surface shall arrange for immediate re-education and re-training of its employees in the transportation and handling of dangerous goods and regarding the impropriety of modification of Type A shipping containers.
    - The Order will be considered closed when Canadian Sub-Surface has provided evidence of the re-education and re-training of its employees in the transportation and handling of dangerous goods and regarding the impropriety of Type A shipping containers.

32. Canadian Sub-Surface reported to have responded appropriately to the information that two containers emitted higher than anticipated levels of radiation, even before learning of the unauthorized modifications to the shipping containers. The licensee added that management clearly showed a concern for the health and safety of its workers and the public, even where it initially believed that the containers met legal standards for radiation dose rates.

33. Canadian Sub-Surface noted that it has demonstrated a clear intention not only to abide by the regulations, but to encourage safety and limit the risks associated with the use of radiation sources. Canadian Sub-Surface listed the actions it had taken to resolve the issues:
    - It had voluntary ceased all operations until it could satisfy itself and its employees that it is in compliance with its rules, policies and procedures as well with CNSC requirements;
    - It has done its own investigation and has instructed a root cause analysis of both incidents to be completed so that remedial measures can be implemented;
    - It has engaged a third-party radiation safety consultant to provide a review of its policies, procedures and training, and to provide further training to its employees with regard to handling , transportation and use of nuclear materials;
    - It has Ordered new shipping containers to replace those modified;
    - It has created a new Radiation Audit Policy which includes provision for two annual field audits of each employee handling radioactive material and further provides for independent third party audits on a reasonable frequency with reports to management of any deficiencies;

- It has retained a third party radiation safety consultant to review a new competency assessment checklist for its staff;
- It has demonstrated a commitment to safety;
- It has demonstrated a commitment to improvement in the training of its employees;
- It has retained a third party consultant to provide regulatory training to senior management so it can understand the regulations and ensure compliance;
- It has demonstrated willingness to pursue continuing improvement in its policies and programs relating to nuclear sources; and
- It has co-operated with the CNSC inspectors at all time.

34. In addition to these actions already taken, Canadian Sub-surface presented to CNSC staff, on October 16, 2009, a detailed action plan to address the issues raised in the Order to which CNSC staff has confirmed their support. Canadian Sub-Surface used this action plan as the basis of its request to amend the Order issued on August 31, 2009. The licensee committed to follow this plan in Order to resume operations using nuclear sources. The action plan presented by the licensee is attached in CMD 09-H128.1A.

35. At the October 21, 2009 hearing, Canadian Sub-Surface counsel requested to the Commission that the Order be amended immediately so that Canadian Sub-Surface could resume their activities using nuclear sources the next morning. The counsel noted that CNSC staff was supporting the action plan it had presented and that most of the actions requested in the plan were completed. CNSC staff added that training on radiation safety had been given to all employees involved with nuclear sources usage, as required by CNSC staff in the action measures. Canadian Sub-Surface reiterated that it was ready to resume its activities and that this would not pose risks to its workers, the environment or the public. Canadian Sub-Surface added that it was ready to meet, as scheduled for the week of October 26, 2009, CNSC's inspectors on site so they can verify and validate that Canadian Sub-Surface is in compliance with NSCA requirements.

36. Canadian Sub-Surface also requested from the Commission that its name be changed as soon as possible in its licence, as this irregularity was pointed out by CNSC staff on October 21, 2009, at the hearing, to reflect the company new name as Canadian Sub-Surface Energy Corporation.

37. In response to the Commission's decision, two inspectors from the CNSC Calgary Regional Office inspected the Red Deer and Blackfalds locations of Canadian Sub-Surface on October 28, 2009. The purpose of the inspection was to verify the implementation of the action plan submitted in response to the August 13-14, 2009 incident that occurred during a Canadian Sub-Surface drill logging project near Goodlands, Manitoba. The site inspections focused on the Action Plan that Canadian Sub-Surface provided to the CNSC as a result of their investigation and discussions with CNSC staff that occurred on October 16, 2009. A second field inspection was conducted by two CNSC inspectors on November 4, 2009, on a Canadian Sub-Surface crew operating north east of Picture Butte, Alberta.

38. As a result of the inspections performed, CNSC staff recommended that the Commission require Canadian Sub-Surface to provide in writing the following information to the Director, Operations Inspection Division:

- By December 31, 2009, an update on the status of the six following "open" action items identified in the October 28, 2009 CNSC inspection and on the measures taken to close them:
    1. Updating of the "Transport of Dangerous Goods manifest" to include signature line for each destination;
    2. Updating of the safety manual to include handling, transport, and storage of Cs-137 sources;
    3. Reviewing of all employee files to confirm that Transport of Dangerous Goods (TDG) certificates are on file for authorized workers;
    4. Confirming that all Canadian Sub-Surface's Nuclear Energy Workers have been retrained by an independent training consultant including additional radiation safety and TDG training for drivers if they continue to be responsible for source handling and signing consignor's declarations;
    5. Confirming of Advanced Radiation Safety Officer (RSO) Training; and
    6. Confirming that discussions took place with Petroleum Safety Association of Canada (PSAC) to ensure that their members who use nuclear substances understand their obligations under the NSCA.
- By December 31, 2009, all details pertaining to the encapsulation of the Can-Sub Cs-137 sources and Type A shielded container modifications identified during the August 2009 CNSC Investigation; and
- By January 31, 2010, a confirmation of the radiation doses received by Nuclear Energy Workers who reported to have lost their personal dosimeters in 2009.

Conclusion

39. The Commission has considered the information and submission of Canadian Sub-Surface and CNSC staff as presented in the material available for reference on the record for the proceeding.

40. Based on the above information, the Commission, pursuant to paragraph 40(1)(d) of the Nuclear Safety and Control Act, amended temporarily on October 21, 2009 the Order issued by the Designated Officer to the licensee by suspending its applicability for the period from October 22 to November 30, 2009, unless revoked or further amended prior to that date. On November 30, 2009, following its consideration of a follow-up inspection by CNSC staff, the Commission revoked the Order.

41. The Commission also took note of the CNSC staff inspection report dated November 27, 2009 and requests that Canadian Sub-Surface timely provide to CNSC staff all the information outlined in the three recommendations stated in its report and described in paragraph 38 of this Record of Proceedings.

42. The Commission requests that CNSC staff inform the Commission Secretary, by March 31, 2010, on the status of the requests made by the Commission in paragraph 38 above.

M. Binder

DEC 1 1 2009

Michael Binder
President,
Canadian Nuclear Safety Commission

Date