

SI LE PRÉSENT DOSSIER  
AUTRE BUREAU OU UN  
FAIRE PARVENIR UNE  
DÉTENTEUR" À VOTRE SE

DIVISION:	MUNICIPALITY:
HQ	OTTAWA VRS
FILE NUMBER:	
HQ-485-35	
CAPTION:	
OPERATION MORNINGLIGHT	

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VOLUME NO - N<sup>o</sup> DU VOLUME

# OPERATION MORNINGLIGHT

08/11  
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**RCMP GRC**

**TRANSIT  
SLIP**

**FICHE  
DE SERVICE**

• HANDWRITE - ÉCRIRE À LA MAIN

BIN  
BD

Classification

File No. - N° du dossier

GTS 1582-2

TO - A <i>Vedic Records Supervisor</i>	FROM - DE <i>N Co 1/2 Emergency Preparedness Section</i>	Date <i>88-11-16</i>
<i>Serry Cameron Archives Unit</i>	<i>Pat Schiman Vedic Records</i>	<i>88-11-21</i>

<input type="checkbox"/> Comments Commentaires	<input type="checkbox"/> Action Donner suite	<input type="checkbox"/> Prepare Brief Préparer un exposé	<input type="checkbox"/> Return with Current File Retourner avec le dossier actuel
<input type="checkbox"/> Perusal and P.A. Lire et classer	<input type="checkbox"/> Prepare Reply Rédiger une réponse	<input type="checkbox"/> Make File(s) Ouvrir un dossier	<input type="checkbox"/> Check Records Vérifier les dossiers

SUBJECT - SUJET

*Emergency Preparedness Files for Archives*

REMARKS (Use same A-5 for Reply when space permits) - REMARQUES (Si l'espace le permet, répondre sur cette formule)

*Sgt. G. F. Arnott and the undersigned examined contents of our directorate files in boxes 1 to 22. In all cases, the file material touches on policy matters or other topics which have long been declared obsolete or redundant. We have no further use for any of this dead material and recommend that you reduce it to archives storage.*

*H. J. [Signature]*

*Serry:*

*This memo should cover all areas. In my opinion these files are all Historical.*

*Thank you for your help.  
Enclosed 22 Boxes. Secret, Top Secret & NATO.*

*Pat.*

Diary Date - Date d'agenda	Meeting Date - Date de réunion	P.A. - A.C.	
		Date	Init./N° 000000

RCMP GRC

TRANSIT  
SLIP

FICHE  
DE SERVICE

BIN  
BD

Classification

File No. - N° du dossier

• HANDWRITE - ÉCRIRE À LA MAIN

TO - À	FROM - DE	Date
Supervisor, Vedic Records	N Co 1/2 Emergency Preparedness Section	88-09-20

☐ Comments  
Commentaires

☐ Action  
Donner suite

☐ Prepare Brief  
Préparer un exposé

☐ Return with Current File  
Retourner avec le dossier actuel

☐ Perusal and P.A.  
Lire et classer

☐ Prepare Reply  
Rédiger une réponse

☐ Make File(s)  
Ouvrir un dossier

☐ Check Records  
Vérifier les dossiers

SUBJECT - SUJET

Vedic Records File Review

REMARKS (Use same A-5 for Reply when space permits) - REMARQUES (Si l'espace le permet, répondre sur cette formule)

Contents of the following file have been reviewed.  
File is considered "dead"

FILE NO.

HQ 485-35

*[Signature]* S/SN  
N. CO. 1/2 E.P.S.

Diary Date - Date d'agenda

Meeting Date - Date de réunion

P.A. - A.C.

Date

Init./N°

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OUTGOING MESSAGE - MESSAGE SORTANTS

*To Register  
Please card & file  
see telet YKDET289  
80.07.16  
P8/2*

INSTRUCTIONS ON REVERSE - DIRECTIVES AU VERSO

DATE NO	STATION I.D. INDICATIF DU POSTE	DATE	1st
ROUTINE	1980-07-16	UNCLAS	
TO A YELLOWKNIFE DET - S/SGT SHAW	HQ-485-35	OUR FILE - NOTRE N° DE DOSS	
		YOUR FILE - VOTRE N° DE DOSS	
		RELEASING SIGNATURE - SIGNATURE	
		INSP. T.C. JENKIN	
SECURITY POLICY SECTION, SECURITY SYSTEMS BR., OTTAWA		DATE AND TIME	1980-07-16

P8/163/2

RE: UR YKDET289 AND YKDET286

DR. GUMMER, ATOMIC ENERGY CONTROL BOARD, ADVISED GOVERNMENT OF NWT BEING ASKED TO HIRE CONTRACTOR TO MAKE CLEAN-UP OF ~~contaminated~~ CONTAMINATED AREA. AND AECB WILL BE ~~HAVING~~ ONE OF THEIR INSPECTORS OVERSEE THE OPERATION.

80.07.17

*Dr Gummer AECB advised that chief  
of report area determined no  
contamination. This keeps on  
scene.*

*JPT 8/2*

OP REY  
20



0800

VEDIC RCMP

51 RLY OTT JUL 15

IPAPUAQR UNCLAS

TO: COMMISSIONER OTTAWA

FR: YELLOWKNIFE DETACHMENT - S/SGT. SHAW

YKDET289 RE: P8/162/2 AND OUR YKDET286 - DOSIMETER

NOT AWARE OF ANY DOSIMETER ON LOAN TO FORCE AT THIS POINT. INSTRUMEN

T

DESTROYED IN FIRE WAS OWNED BY DEPT. OF HIGHWAYS, GOV'T OF THE N.W.T.

END.

COH

INPUT 14JUL82/14:31/02

14JUL82/14:59/11

\*

VEDIC RCMP

*advised Dr. Brunner  
J.*

180.07.16

OP REV.  
20

JUL 14 8 21 PM '80

TELECOMMUNICATIONS

V\*

VEDIC RCMP

48 RLY OTT JUL14

0003

NT NT10032

ON10078

3 ROUTINE YK 80-7-13 UNCLAS

TO: COMMR OTTAWA ATTN: 'P' DIRECTORATE - O I/C SECURITY SYSTEMS BR

N

FROM: YELLOWKNIFE DET - CST. H.J. LEGERE

YKDET266 RE: YELLOWKNIFE FIRE DEPT

COMPL. OF ARSON

NEAR YELLOWKNIFE, N.W.T. 80-07-13

*Destruction of Dosimeter*

AT 0942 HRS A CALL WAS RECEIVED FROM THE YELLOWKNIFE FIRE DEPT. THAT THEY

WERE IN ATTENDANCE AT A FIRE WHICH APPEARED TO BE AN ARSON.

ATTENDANCE WAS MADE TO THE SCENE AND THE TRAILER, LATER FOUND TO BE A FIELD OFFICE FOR THE N.W.T. GOVT., DEPT. OF PUBLIC WORKS, WAS FOUND COMPLETELY LEVELLED BY FIRE.

A CURSORY INSPECTION WAS MADE OF THE SCENE AND PHOTOGRAPHS TAKEN. THE

INITIAL INVESTIGATION REVEALED THAT SOMEONE HAD ATTEMPTED TO EXTINGUISH

THE FIRE WITH A SMALL FIRE EXTINGUISHER HOWEVER, THE PERSON OR PERSONS

UNKNOWN APPARENTLY FLED THE SCENE.

AT APPROX 1030 HRS THE PERSON IN CHARGE OF THE BURNED BUILDING, MR. CASSIDY,

ATTENDED THE YELLOWKNIFE DET. AND ADVISED WRITER THAT THERE WAS A NUCLEAR

DENSOMETER STORED IN THE OFFICE.

MR. CASSIDY OBTAINED LITERATURE ON THE DEVICE AND PRODUCED SAME TO THE

WRITER. THE DEVICE WAS LEARNED TO BE THE FOLLOWING:

MANUFACTURER: TROXLER LABORATORIES

TYPE: SURFACE MOISTURE - DENSITY GAUGE

MODEL: 3400-B SERIES

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THE FIRE WITH A SMALL FIRE EXTINGUISHER HOWEVER, THE PERSON OR PERSON  
S

UNKNOWN APPARENTLY FLED THE SCENE.

AT APPROX 1230 HRS THE PERSON IN CHARGE OF THE BURNED BUILDING, MR. C  
ASSIDY,

ATTENDED THE YELLOWKNIFE DET. AND ADVISED WRITER THAT THERE WAS A NUC  
LEAR

DENSOMETER STORED IN THE OFFICE.

MR. CASSIDY OBTAINED LITERATURE ON THE DEVICE AND PRODUCED SAME TO TH  
E

WRITER. THE DEVICE WAS LEARNED TO BE THE FOLLOWING:

MANUFACTURER: TROXLER LABORATORIES

TYPE: SURFACE MOISTURE - DENSITY GAUGE

MODEL: 3400-B SERIES

THE INSTRUMENT CONTAINS RADIOACTIVE MATERIALS, DESCRIBED AS FOLLOWS:

1. NAME: CESIUM 137

GROUP : III

FORM: SPEC FORM TYPE 'A'

ACTIVITY: .028 Curies

2. NAME: AMERICIUM 241: BERYLLIUM

GROUP: I

FORM: SPEC. FORM TYPE 'A'

ACTIVITY: .246 Curies

CONT'D PAGE 2 .....

VEDIC RCMP

VEDIC RCMP

49 RLY OTTT JUL14

0005

NT NT10032

ON10078

TO: COMMR OTTAWA ATTN: 'P' DIRECTORATE - O I/C SECURITY SYSTEMS BR

FROM: YELLOWKNIFE DET - CST. H.J. LEGERE

PAGE 2 YKDET286 UNCLAS

THE PRECEEDING INFORMATION OBTAINED FROM SAMPLE, SHIPPERS CERTIFICATI  
ON  
FOR RADIOACTIVE MATERIALS, FOUND IN INSTRUCTION MANUAL.

*alter Gork*  
MR. WETHERALL OF ENVIRONMENT CANADA, EDMONTON, ALTA. ADVISED THAT THE  
'CANADIAN ADMIRAL' DETECTOR USED LOCALLY WOULD NOT DETECT THE AMERICI  
UM

241: BERYLLIUM AND THEREFORE THE PROPER DETECTOR IS BEING SHIPPED TO  
THIS

POINT VIA P.W.A. AIR CARGO AND IS EXPECTED TO ARRIVE THIS POINT IN EA **REV**  
RLY **10**

AM OF 80-07-14.

AN INSPECTION OF THE SITE WAS CONDUCTED WITH THE CANADIAN ADMIRAL DET  
ECTOR

AND NOTHING WAS DETECTED. THIS TEST WAS CONDUCTED BY EMERGENCY MEASU  
RES  
ORGANIZATION PERSONNEL.

DUE TO THE FACT THAT THE POSSIBILITY EXISTS OF RADIOACTIVE CONTAMINAT  
ION THE

SCENE WAS SECURED PENDING A CHECK OF THE AREA WITH PROPER EQUIPMENT.  
TO BE CONDUCTED IN AM OF 80-07-14.

MR. WETHERALL ADVISED THAT THE CONTAMINATION WOULD BE DANGEROUS ONLY  
AT

A DISTANCE OF 6 - 8 FEET AND THEREFORE, DUE TO THE ISOLATED AREA, NO  
EVACUATION PROCEDURES IMPLEMENTED.

ARMED FORCES THIS POINT HAVE NO RESOURCES TO ASSIST IN THIS CASE. AS  
SISTANCE

BEING OBTAINED THROUGH EMERGENCY MEASURES ORGANIZATION.

FURTHER REPORT TO FOLLOW. END

DPO/

INPUT 14JUL80/00:40/15

000000



RLY

AM OF 80-07-14.

AN INSPECTION OF THE SITE WAS CONDUCTED WITH THE CANADIAN ADMIRAL DET  
ECTOR  
AND NOTHING WAS DETECTED. THIS TEST WAS CONDUCTED BY EMERGENCY MEASU  
RES  
ORGANIZATION PERSONNEL.

DUE TO THE FACT THAT THE POSSIBILITY EXISTS OF RADIOACTIVE CONTAMINAT  
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SISTANCE  
BEING OBTAINED THROUGH EMERGENCY MEASURES ORGANIZATION.

FURTHER REPORT TO FOLLOW. END

DPO/

INPUT 14JUL80/00:40/15

14JUL80/00:48/35

VEDIC RCMP

OUTGOING MESSAGE — MESSAGE SORTANTS

● INSTRUCTIONS ON REVERSE — DIRECTIVES AU VERSO

DAILY NO. N° QUOTIDIEN	PRECEDENCE FOR — PRIORITÉ POUR		STATION I.D. INDICATIF DU POSTE	DATE	SECURITY CLASSIFICATION CLASSIFICATION SÉCURITAIRE
	ACTION ADDR SUITE À DONNER	INFO ADDR RENSEIGNEMENTS			
	ROUTINE				UNCLAS.
TO A          FM DE  SECURITY POLICY SECTION SECURITY SYSTEMS BRANCH, 'P' DIR.				OUR FILE — NOTRE N° DE DOSSIER	
				YOUR FILE — VOTRE N° DE DOSSIER	
				RELEASING SIGNATURE — SIGNATURE DE L'APPROBATEUR  INSP. T.C. JENKIN	
				DATE AND TIME — DATE ET HEURE  1980-07-14	

ORIGINATOR'S REFERENCE NO. — N° DE RÉFÉRENCE DE L'AUTEUR

P8/7/2

RE YKDET 286

KINDLY ADVISE IF THE DOSIMETER DESTROYED IN THE FIRE ~~TO~~ THE  
DEPARTMENT OF PUBLIC WORKS TRAILER WAS ONE OF THOSE LOANED  
TO THE FORCE BY THE ATOMIC ENERGY CONTROL BOARD.

1100 NRS 80.07.14

Advised Dr. Gummer AECB (55909) of  
accident. He didn't believe this was  
one of them but wanted confirmation  
& test results. J.

OP REV  
20

## INSTRUCTIONS

**DAILY NO** — Comcentre use only

**PRECEDENCE** — Enter for all

A) Action addresses, e.g. **ROUTINE, URGENT OR EMERGENCY.**

B) Information addresses, usually routine.

**STATION I.D.** — Comcentre use only.

**DATE** — Use approved format.

**SECURITY CLASSIFICATION** — If unclassified, insert UNCLAS

### ADDRESS:

**TO:** A) Enter all action addresses, e.g. **H DIV HFX; NELSON S/DIV; SHEDIAC DET.**

B) Abbreviations are not to be used if addressee is outside the Force.

C) If information addresses are required, add **"INFO"** then address.

D) Include **ATTN** Branch or individual's name if required, e.g. **H DIV HFX ATTN GIS.**

**FM:** A) Enter originator's address in abbreviated form and include Branch or individual's name if required. Do not use abbreviations if address is outside the Force.

**TEXT:** A) Enter originator's reference number. It will be transmitted as first word of text of message.

B) When replying to a message quote original message number, e.g. **CIB62** your **CPSIC1284/13.**

C) When sending follow-up message, quote original message number, Date and Subject Caption, e.g. **CIB62** further to **CIB59** of **78-02-12** re **FPS 100001** John Smith fraud . . . . .

D) Should be clear and concise. Omit articles and prepositions where feasible.

E) Abbreviations are not to be used if addressee is outside the Force.

F) The end of text is indicated with the word **END.**

**OUR FILE** — Self explanatory.

**YOUR FILE** — Self explanatory.

**RELEASING SIGNATURE** — Signature authorizing the transmission of the message.

**DATE & TIME** — When message is signed.

## DIRECTIVES

**Nº QUOTIDIEN** — Réservé au Centre de communication

**PRIORITÉ** — À indiquer dans tous les cas

A) Où il faut donner suite à une affaire: **ORDINAIRE, URGENT OU EXTRÊMEMENT URGENT.**

B) À titre de renseignements: habituellement ordinaire.

**INDICATIF DU POSTE** — Réservé au Centre de communication

**DATE** — Se conformer à la directive officielle.

**CLASSIFICATION SÉCURITAIRE** — S'il s'agit d'un message non classifié, inscrire **NON CLASS.**

### ADRESSE:

**A:** A) Inscrire l'adresse de toutes les personnes qui doivent donner suite à l'affaire, p. ex. **DIV. "H" HALIFAX; S.-DIV. DE NELSON; DÉT. DE SHEDIAC.**

B) Ne pas se servir d'abréviations dans le cas d'un destinataire qui n'est pas de la Gendarmerie.

C) Lorsque l'adresse de tous ceux qui doivent recevoir le message à titre de renseignements est requise, ajouter **"RENS."** puis l'adresse.

D) Inscrire la mention **À L'ATTENTION DE** suivie de la sous-direction ou du nom de l'individu au besoin, p. ex. **DIV. "H" HALIFAX À L'ATTENTION DE LA S.E.G.**

**DE:** Inscrire l'adresse de l'auteur sous forme abrégé ajouter la sous-direction ou le nom de l'individu au besoin. Lorsqu'il s'agit d'une adresse qui n'est pas de la Gendarmerie, ne pas se servir d'abréviations.

**TEXTE:** A) Inscrire le nº de référence de l'auteur. Il sera transmis comme premier mot du texte.

B) Lorsque vous répondez à un message, citez le numéro de ce message, p. ex. **SDEJ62** votre nº **C.I.S.C.P. 1284/13.**

C) Lorsque vous donnez suite à un message, citez le numéro de ce message, la date et l'objet en rubrique, p. ex. **S.-D.E.J. 62** suite à **S.-D.E.J. 59** du **78-02-12**, objet nº **FSP 100001** John Smith, escroquerie . . . . .

D) La clarté et la concision sont de rigueur. Or les articles et les prépositions dans la mesure du possible.

E) Lorsqu'il s'agit d'un destinataire qui n'est pas de la Gendarmerie, éviter les abréviations.

F) À la fin du texte, inscrire le mot **FIN.**

**NOTRE Nº DE DOSSIER** — Se passe de commentaires.

**VOTRE Nº DE DOSSIER** — Se passe de commentaires.

**SIGNATURE DE L'APPROBATEUR** — Signature de la personne qui a autorisé la transmission du message.

**DATE ET HEURE** — Lorsque le message est signé.

● HANDWRITE - ÉCRIRE À LA MAIN

Classification

File No. - N<sup>o</sup> du dossier

79-10-02-50-1

1	TO - À	FROM - DE	DATE
2	"F" Directorate	FED. POL. BR.	SEP 24 1979
3	Inspector J. J. J.	Sgt. Banerjee	
4			

SUBJECT - SUJET

Operation Morning Light HQ-485-35

- |  |  |  |
|--|--|--|
| <input type="checkbox"/> Comments<br>Commentaires  | <input checked="" type="checkbox"/> Prepare Reply<br>Réponse à rédiger | <input type="checkbox"/> Make File(s)<br>Dossier(s) à ouvrir                           |
| <input type="checkbox"/> Perusal - No action required<br>Pour information - aucune suite requise | <input type="checkbox"/> Prepare Brief<br>Exposé à préparer            | <input type="checkbox"/> Return with Current File<br>Retourner avec le dossier courant |
| <input type="checkbox"/> Examination and Action<br>Pour examen et suite                          | <input type="checkbox"/> See Sender<br>Voir l'expéditeur               | <input type="checkbox"/> Check Records<br>Vérifier les archives                        |

REMARKS - COMMENTAIRES

REPLY - RÉPONSE

Forwarded for your info.

"G" were advised that no other agency need be advised.

*[Signature]*

For your information. No action required.

*[Signature]*

79/09/25

SEP 24 1979

OP 15

PA 79-09-25

A-5 (477) 7530-21-029-4767



ROYAL CANADIAN MOUNTED POLICE

GENDARMERIE ROYALE DU CANADA

TRANSIT SLIP

FICHE DE SERVICE

PA

Initial - Initiales

Date

000000

4006.9

SEP 14 3 58 PM '79

SEP 14 3 58 PM '79

"C" L... RATE

O

03

CIB OTT

032 RELAY OTT SEP 14

0035

NT NT10035

ON10078

20 PRIORITY YK 79-09-14 UNCLAS

79HQ-102-50-1

COMMR OTT

INFO:O.I.C.L. TASON BRANCH

GCIB513/2 ATTN:D.C.I. FURTHER TO OUR GCIB505/2 RE:LOCATION OF POSSI  
BLE  
SATELLITE PIECES. FURTHER INFO INDICATES LOCAL HUNTERS HAVE LOCATED  
OTHER  
PIECES LARGER AND SMALLER, IN SAME AREA, DURING SPRING 1979. NOT REP  
ORTED  
TILL NOW. LETTERS ON PIECE WE HAVE IN OUR POSSESSION INDICATE MAY BE  
FROM  
RUSSIAN ALPHABET. ONE LETTER 'L' POSITIVELY IDENTIFIED BY LOCAL SCHO  
OL  
TEACHER AS FROM RUSSIAN ALPHABET. DND NRHQ YELLOWKNIFE ADVISE THEY W  
ISH  
TO RETRIEVE PIECES. ARRANGEMENTS BEING MADE. ADVISE IF ANY OTHER AG  
ENCY  
MUST BE NOTIFIED BY THIS HQ. TESTS FOR RADIOACTIVITY ARE BEING CARRI  
ED OUT  
AT PRESENT.

G DIV YELLOWKNIFE

INPUT 14SEP79/15:48/56

14SEP79/15:52/41

3:09 PM  
J. H. H.

03

CIB OTT

000000

1979 August 02

HQ-485-35

Director General  
Information  
National Defence Headquarters  
101 Colonel By Drive  
Ottawa, Ontario  
K1A 0K2


Dear Sir:

Re: Operation Morninglight


Please find attached self-explanatory correspondence directed to our northern detachment at Coppermine, N.W.T., concerning the Russian satellite "Cosmos 954".

We understand that the Department of National Defence handled all media enquiries during this particular incident and, therefore, it would appear to be in order for your department to reply to Mr. Benner regarding this matter.

Yours truly,

  
T.C. Jenkin, Insp.,  
Officer in Charge  
Security Policy Section,  
Security Systems Branch

Att.

BJB/vmh

cc: File HQ-485-35  
Letterbook

PA 8/2  
179.08.08  
000000

• HANDWRITE - ÉCRIRE À LA MAIN

Classification

File No. / N° du dossier

HQ 485-35

1	TO - À	FROM - DE	DATE
2	Mrs. Germain	Mr. A. Barret	19-08-02
3	Mr. Barret	Mr. J.	02
4			

SUBJECT - SUJET

Operation Morninglight

☐ Comments  
Commentaires

☐ Prepare Reply  
Réponse à rédiger

☐ Make File(s)  
Dossier(s) à ouvrir

☐ Perusal - No action required  
Pour information - aucune suite requise

☐ Prepare Brief  
Exposé à préparer

☐ Return with Current File  
Retourner avec le dossier courant

☐ Examination and Action  
Pour examen et suite

☐ See Sender  
Voir l'expéditeur

☐ Check Records  
Vérifier les archives

REMARKS - COMMENTAIRES

REPLY - RÉPONSE

Please note the attached letter from a George Benner, Dept. of Education, Adelphi University, N.Y. This does not appear to be the type of letter originating from an accredited University. At any rate I don't think we have the info. Mr. Benner is requesting and possibly it should be referred to AECB for reply.

DND info Benner handled the public relations aspect. Ppl contact them & determine who we can refer this letter to for reply.

J 79.8.02

A-5 (4/77) 7530-21-029-4767



ROYAL CANADIAN  
MOUNTED POLICE

GENDARMERIE ROYALE  
DU CANADA

TRANSIT  
SLIP

FICHE  
DE SERVICE

PA

Initial - Initiales

Date

000000



Government of Canada  
Gouvernement du Canada

# MEMORANDUM

# NOTE DE SERVICE

TO  
A

OFFICER IN CHARGE  
"G" DIVISION  
C.I.B.

FROM  
DE

N.C.O. IN CHARGE  
R.C.M. POLICE  
COPPERMINE DET.

SECURITY - CLASSIFICATION - DE SÉCURITÉ

OUR FILE - N/RÉFÉRENCE

YOUR FILE - V/RÉFÉRENCE

DATE


79 JUN 30

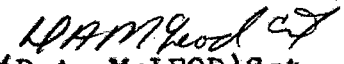
SUBJECT  
OBJET

Re: George BENNER  
Request For Info

The attached letter from c/n subject who is with the Dept. of Education, Adelphi University, Garden City, Long Island, N.Y., U.S.A. was received on 79 JUN 28.

This request is being forwarded to your office in order that an appropriate reply can be made to BENNER's enquiries. No correspondence is being sent to BENNER from writer.

  
(R.A.R.S.) Cpl.  
i-c Det.

  
(D.A. McLEOD) Cst.  
Coppermine Det.



*Adelphi University • Garden City, Long Island, New York 11530*

GEORGE B. BENNER  
DEPARTMENT OF EDUCATION

June 15, 1979

Constable Dale McCloud  
Royal Mounted Police  
Yellow Knife, District of MacKengie  
Canada

Dear Constable McCloud:

I am writing to you in hope that you may be able to give me some information concerning the recovery of any of the remains from the Russian satellite that fell near Baker Lake.

All coverage of the event down here ended about one week after the re-entry and I wonder about the current state of affairs. I teach science for people who intend to teach elementary school children some day, and I hope that my students don't let things go that could jeopardize our environment and our people.

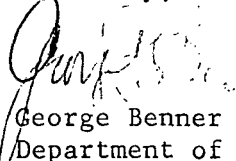
I plan to come up there and nose around myself if that's needed, but I hope I can reach the information by letters.

One of the last reports on Saturday, January 30th, 1978 was that six members of the search team had been hospitalized. Can you help me with these questions? If not, would you direct my letter to someone who could do so.

As you can see I'm not a reporter, but a school teacher who is concerned with the bottom falling out of nearly every serious news event that occurs lately.

Thanks.

Sincerely,

  
George Benner  
Department of Education

GB:jsi

JUL 12 1979



Government of Canada  
Gouvernement du Canada

MEMORANDUM

NOTE DE SERVICE P. Dir

Insp Jenkins

TO  
A  
COMMISSIONER, OTTAWA  
ATTN: O.I.C. FEDERAL POLICING BRANCH

FROM  
DE  
OFFICER IN CHARGE "G" DIVISION C.I.B.

SUBJECT  
OBJET

Soviet Satellite  
Cosmos 954

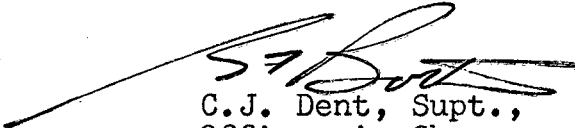
SECURITY - CLASSIFICATION - DE SÉCURITÉ
OUR FILE - N/RÉFÉRENCE 79G-700-23
YOUR FILE - V/RÉFÉRENCE 78HQ-102-15-4
DATE 79-07-09

Trans to HQ-485-35

Attached for your information and attention is a letter dated June 15, 1979 from a George BENNER, along with a forwarding memo from our Coppermine Detachment where Cst. McLEOD is presently stationed.

2. As BENNER appears to have some strong opinions in relation to this incident, it is felt that this office is not in a position to decide what, if any, information should be passed along to him.

3. In view of the foregoing, would your Branch please make a suitable reply to BENNER regarding this matter.

  
C.J. Dent, Supt.,  
Officer in Charge  
Criminal Investigation Branch

5/5/79 for HQ

Att.

AUG 6 1979

JUL 13 1979



Government  
of Canada

Gouvernement  
du Canada

MEMORANDUM

NOTE DE SERVICE

TO  
A

COMMISSIONER, OTTAWA  
ATTN: O.I.C. FEDERAL POLICING BRANCH

FROM  
DE

OFFICER IN CHARGE "G" DIVISION C.I.B.

SECURITY - CLASSIFICATION - DE SÉCURITÉ
OUR FILE - N/RÉFÉRENCE  79G-700-23
YOUR FILE - V/RÉFÉRENCE  78HQ-102-15-4
DATE  79-07-09

SUBJECT  
OBJET

Soviet Satellite  
Cosmos 954

Attached for your information and attention is a letter dated June 15, 1979 from a George BENNER, along with a forwarding memo from our Coppermine Detachment where Cst. McLEOD is presently stationed.

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3. In view of the foregoing, would your Branch please make a suitable reply to BENNER regarding this matter.

C.J. Dent, Supt.,  
Officer in Charge  
Criminal Investigation Branch

Att.

VRK/cch

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OPERATION MORNINGLIGHT

As a result of public pressure, the Dept. of Indian and Northern Affairs and the Atomic Energy Control Board agreed that personal dosimeters, furnished to a few "G" Division detachments, may be loaned to northern residents in the Cosmos 954 "fallout" area.

D.N.D. supplied a copy of a 16 mm. film they developed on the Cosmos 954 recovery operation. The film primarily dealt with the military presence; however, it did make mention of the contributions of others, e.g. A.E.C.B., E.M.R., R.C.M.P., etc. The film was forwarded to "G" Division.

During the period October through to January, members of the Force's Legal Branch and the Financial Management Branch worked with the Dept. of External Affairs in preparing the claim for damages (\$6,041,174.70) which was presented to the Soviet Union on 79-01-23. The claim covered "incremental costs" only. The Force's share amounted to \$14,532.85.

This matter is now considered concluded.

79-02-27

T.C. Jenkin, Insp.,  
OIC Security Policy Section  
Security Systems Branch

OP REV  
15

~~CONFIDENTIAL~~

TRANSIT SLIP



FICHE DE SERVICE

Date

79-02-12

TO Tasp SENKINS  
À Off Security Policy Section  
"P" DIT  
Uedic Bldg

FROM Sgt B.F. COUPER  
DE Financial Management Br.

Comments ☐ Commentaires

Make File(s) ☐ Dossier(s) à ouvrir

Perusal - No Action Required ☐ Pour information - aucune suite requise

Return with Current File ☐ Retourner avec le dossier courant

Examination and Action ☐ Pour examen et suite

Check Records ☐ Vérifier les archives

Prepare Reply ☐ Réponse à rédiger

Instructions ☐ Directives

Prepare Brief ☐ Exposé à préparer

See Sender ☐ Voir l'expéditeur

REMARKS  
COMMENTAIRES

Returned for your file is the material  
relating to Canada's claim against the  
Russians

Thanks  
B. Couper

REPLY  
RÉPONSE

PP12  
J 19.01.13

OP REV  
3

000000

Department of External Affairs



Canada

Ministère des Affaires extérieures

OTTAWA, K1A OG2

NO. FLA-268

Excellency,

I have the honour to present the claim of Canada against the Union of Soviet Socialist Republics in respect of damage to Canada, its citizens and residents, caused by the Soviet Cosmos 954 nuclear-powered Satellite on and after January 24, 1978.

The claim of Canada for compensation for damage caused by the Soviet Cosmos 954 Satellite is based on the relevant international agreements and in particular the 1972 Convention on International Liability for Damage caused by Space Objects, to which both Canada and the Union of Soviet Socialist Republics are parties, and on general principles of international law. The claim of Canada for compensation, in the amount of \$6,041,174.70 (Canadian), is presented without prejudice to the right of Canada to make additional claims for compensation in this matter in respect of damage not yet identified or determined or, given the

.... /2

His Excellency Alexander N. Yakovlev,  
Ambassador of the Union of Soviet  
Socialist Republics,  
OTTAWA.

- 2 -

nature of nuclear contamination, damage that has not yet occurred.

The following documentation is submitted in support of this claim:

- A. A Statement of Claim;
- B. The texts of diplomatic communications, between the Department of External Affairs and the Embassy of the Union of Soviet Socialist Republics in respect of the Soviet Cosmos 954 Satellite; and
- C. A Schedule of Costs incurred by Canada during Phase I of operations (January 24 - April 20, 1978) undertaken as a consequence of the events giving rise to Canada's claim.

The following additional documentation will be submitted in due course:

- D. A Schedule of Costs incurred by Canada during Phase II of operations (April 21 - October 15, 1978) undertaken as a consequence of the events giving rise to Canada's claim; and
- E. A Schedule of Recovered Debris, being a description of Soviet Cosmos 954 Satellite debris, the location of recovery, the radiation level and the disposition.

The claim of Canada for compensation for damage caused by the Soviet Cosmos 954 Satellite is preferred against the Union of Soviet Socialist Republics in accordance

.... /3

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- 3 -

with the international practice of States and the provisions of the 1972 Convention on International Liability for Damage caused by Space Objects. The presentation of this claim is without prejudice to the right of Canada to invoke the provisions of the Convention concerning the establishment of a Claims Commission and is further without prejudice to the form and substance of pleadings, oral arguments and documents that may be submitted by Canada to such a Commission.

Accept, Excellency, the renewed assurances of my highest consideration.

Secretary of State  
for External Affairs



Department of External Affairs



Canada

Ministère des Affaires extérieures

OTTAWA, K1A 0G2

CONFIDENTIAL

January 23, 1979

Dear Inspector Jenkin,

Re: Cosmos 954 claim

Canada's claim against the Soviet Union will be presented to the Soviet Ambassador by the Secretary of State for External Affairs at 5:00 p.m. on January 23, 1979. Attached for your information are copies of the documentation which constitutes the claim:

First Person Note

Annex A - Statement of Claim;

Annex B - Texts of Official Communications;

Annex C - Schedule of Costs - Phase I.

Annex D (Schedule of Costs - Phase II) and Annex E (Record of Debris) will be provided once they are available.

It is expected that Mr. Jamieson will announce the presentation of the claim by issuing a brief press communique late on January 23 or by making a statement in the House of Commons on January 24, 1979. In either event, only the main features of the claim will initially be made public. In order to give the Soviet authorities an opportunity to examine the claim, the claim documents themselves will not be released to the public until a week has elapsed from the time

Inspector T.C. Jenkin  
Office in charge  
Security Policy Section  
Security Systems Branch  
RCMP  
Vedic Building, Room 118  
720 Belfast Road  
OTTAWA, K1A 0R2

79.01.23  
Material sent to  
Sgt. Cooper  
for personal  
PA 88/2

.../2

OP REV  
12

- 2 -

CONFIDENTIAL

of presentation. I will be in contact with you further to advise specifically as to whether the initial publicity will be by a communique or a statement in the House, and on the timing and date of release of the claim documents.

I would like to remind you of the interdepartmental agreement as to publicity and of the desirability that this Department coordinate all replies to public and media inquiries on the claim. I suggest that your Press Office be advised to refer all inquiries to the Press Officer of this Department.

Finally, for your information, in view of the role played by the Government of the United States in the Cosmos operations, I am informing the United States Embassy in Ottawa today of the presentation of the claim to the Soviet Union. The United States Embassy will be provided with an advance copy of the claim documentation.

Yours sincerely,



W.H. Montgomery,  
Director,  
Legal Advisory Division.

IN THE MATTER OF A CLAIM FOR COMPENSATION PRESENTED  
BY CANADA TO THE SOVIET UNION FOR DAMAGES INCURRED  
AS A RESULT OF THE INTRUSION ON CANADIAN TERRITORY  
ON JANUARY 24, 1978 OF THE COSMOS 954 SATELLITE  
LAUNCHED BY THE SOVIET UNION

AFFIDAVIT OF ELIZABETH STRINGER

I, Elizabeth Stringer, of the City of Ottawa,  
of the Province of Ontario, public servant, MAKE OATH  
AND SAY AS FOLLOWS:

1. I am employed in the position of Administrative Officer in the Radiation Protection Bureau, Department of National Health and Welfare of the Government of Canada and as such I have knowledge of the matters hereinafter deposed.

2. In that position my regular duties include: being aware of expenditures incurred by the Radiation Protection Bureau; being shown the invoices and other business records which document the amounts owed for services and materials rendered to the Radiation Protection Bureau; being responsible for the necessary steps to determine if these invoices and business records accurately reflect the amounts owed for services and materials rendered to the Radiation Protection Bureau.

3. Between January 24, 1978 and April 20, 1978 the Department was actively involved in the search and recovery

- 2 -

operation for the debris from the Cosmos 954 Satellite. I am informed by Dr. H. Taniguchi, Chief, Environmental Radiation Hazards Division, Radiation Protection Bureau, and I verily believe that: on January 24, 1978, the Radiation Protection Bureau activated its National Radio-activity Monitoring Network, consisting of 24 air sampling stations, to collect daily samples of particulate matter in air. These samples were air-expressed to the Ottawa Laboratory to analyse for any radioactivity which may have resulted from the re-entry into the atmosphere of COSMOS 954. This search for radioactive material continued for 21 days. In addition, a new air sampling station was established at Hay River.

From the outset of the search and recovery operations, the Radiation Protection Bureau supplied radiation dosimeters to the Department of National Defence and the Atomic Energy Control Board. This monitoring of personal exposure to radiation was essential for the safety of the personnel engaged in the search and recovery. In addition to monitoring for external radiation, urine samples from these personnel were analysed for internal exposure to radioactivity.

- 3 -

When finely divided radioactive particles were found south of Great Slave Lake, it became essential to determine the level of radioactivity present in snow, soil and water samples obtained from inhabited areas. A technician from the Radiation Protection Bureau was sent to Hay River, Pine Point and Yellowknife to collect the necessary samples. The samples were subsequently analysed for radioactivity in the laboratories in Ottawa.

As these radioactive particles could be ingested accidentally and could affect the drinking water supply, it was essential to characterize their radiological properties, to estimate their behaviour if ingested and to determine their solubility in ground water. These laboratory studies were carried out in Ottawa.

4. The total amount spent by the Radiation Protection Bureau to April 20, 1978 inclusive in the search and recovery operation was \$18,031.11 dollars. These expenditures were incurred for the following goods and services:

COSMOS 954 - Expenses from January 24 to April 20, 1978

Costs presented here are those incurred during the period from January 24 to April 20, 1978 by the Radiation Protection Bureau for the analyses of samples of soil, air, snow and radioactive particles collected for investigation as a result of COSMOS 954.

Travel

Cost of return travel from Ottawa to Edmonton, Hay River and Yellowknife and for accommodation on site are detailed in Annex I. Annex I(a) lists overtime expended.

Transportation of Equipment

Costs of shipping equipment to the field are listed in Annex II. These costs include transporting a survey meter, an air monitoring pump, motor and shelter to Hay River, N.W.T.

Transportation of Air, Water, Snow and Soil Samples

Costs for shipping samples from 24 air sampling stations across Canada to the Radiation Protection Bureau, Ottawa, for analyses as outlined in Annex III. Samples of snow, soil and water were also shipped from Hay River.

Materials and Supplies

Included here in Annex IV are materials and supplies purchased to ensure positive identification of samples shipped and/or taken from sampling stations and correct and accurate analyses of samples at the Radiation Protection Bureau, Ottawa.

Equipment

Cost of equipment and approved containers for collecting samples of air, water, snow and soil at Hay River and Yellowknife for analyses at the Radiation Protection Bureau are listed in Annex V.

Laboratory Analyses and Instrument Use

A cost of \$50.00 per sample has been assigned for laboratory instrument time and depreciation, use of laboratory facilities and laboratory materials not specifically allocated in Annexes IV and V. The cost of these analyses is shown in Annex VI.

Salaries

Regular salary costs representing 130 man days are listed in Annex VII.

COSMOS 954 Expenses from Jan. 24-Apr. 20, 1978

Summary of Costs

Annex I	Travel	Sub-Total	\$ 981.75
Ia	Overtime	"	390.00
Annex II	Transportation (equipment)		159.32
Annex III	Transportation (samples)		1564.95
Annex IV	Materials & Supplies		324.04
Annex V	Equipment		489.05
Annex VI	Laboratory Analyses & Instrument Use		4850.00
Annex VII	Salaries		9272.00
			<hr/>
	TOTAL CLAIM		\$18,031.11



ANNEX I

TRAVEL (Ottawa to Edmonton, Hay River, Yellowknife and return)

The total cost for the Radiation Protection Bureau to maintain one (1) employee for the period March 14 to March 20, 1978 was \$981.75.

Details are as follows:

Airfare via Air Canada & Pacific Western	\$557.25
Accommodation - Edmonton Inn, Caribou Motor Inn, Yellowknife Inn	139.00
Meals & Incidental Expenses	122.10
Transportation & Shipping Charges	163.40
SUB TOTAL	<u>\$981.75</u>

ANNEX I(a)

Overtime

6 man days @ \$65 per day = \$390.00

COSMOS 954 Expenses from Jan. 24-Apr. 20, 1978

Annex II Transportation (Equipment)

Name of Supplier	Product or Services Supplied	Date Paid	Amount
Expidair	Charge for shipment of equipment (survey meter)	10/3/78	\$ 55.00
Air Canada Cargo	Charge for shipment of equipment (shelter, pump & motor)	15/3/78	104.32
Sub Total			<hr/> \$159.32

COSMOS 954 Expenses from Jan. 24-Apr. 20, 1978

Annex III Transportation (Samples)

Name of Supplier	Product or Service Supplied	Date Paid	Amount
CP Air	Charges for transportation of samples from sampling stations to RPB for analysis	Jan. 24-Apr. 20	\$1420.45
Pacific Western Air	Charges for transportation of samples from sampling stations to RPB for analysis	Jan. 24-Apr. 20	85.50
Transair	Charges for transportation of samples from sampling stations to RPB for analysis	Jan. 24-Apr. 20	59.00
Sub Total			\$1564.95

COSMOS 954 Expenses from Jan. 24-Apr. 20, 1978  
Annex IV Materials and Supplies

Name of Supplier	Product or Service Supplied	Date Paid	Amount
Canus Plastics	Metal cans with lids	22/3/78	\$30.00
Canus Plastics	3 gallon pails	11/3/78	51.84
Canus Plastics	Acrylic tubing	11/3/78	8.56
Dept'l Stores	Cards for 24 stations for 21 days	29/3/78	20.16
	Reply envelopes for 24 stations for 21 days	29/3/78	20.16
	Containers with caps	10/3/78	6.48
	Kimwipes, tags	14/3/78	6.40
	Glass filters	6/3/78	18.00
	Reagents (Scintillator Solution)	6/3/78	60.00
	Sampling bottles	6/3/78	10.00
	Vials	6/3/78	4.00
	Glass filters	7/2/78	88.44
Sub Total			<hr/> \$324.04

COSMOS 954 Expenses from Jan. 24-Apr. 20, 1978

Annex V Equipment

Name of Supplier	Product on Service Supplied	Date Paid	Amount
Dept's Stores	Vacuum Pump	6/3/78	\$369.00
	1/2 H.P. motor	6/3/78	100.00
	Vacuum gauge	6/3/78	7.50
	Vacuum belt	6/3/78	1.09
Beaver Lumber	Plywood and nails	11/3/78	8.17
	Plumbers tape & film	15/3/78	3.29
Sub Total			<u>\$489.05</u>

- 12 -

ANNEX VI

Laboratory Analyses and Instrument Use

Gamma spectrometric analyses of air filters	\$2100.00
Gamma spectrometric analyses of precipitation	250.00
Study of solubility of particles	1000.00
Liquid scintillation counting and gamma spectroscopy	1500.00
	<hr/>
SUB-TOTAL	\$4850.00

- 13 -

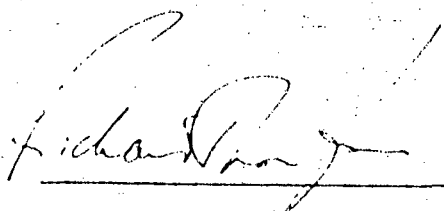
ANNEX VII

SALARIES

<u>Nature of Investigation</u>	<u>Man Days</u>	<u>Salary</u>
Environmental Monitoring	48	3115
Solubility Studies	14	1010
Bio-assay	11	807
Film Monitoring	22	1100
Co-ordination & Management	35	3240
TOTAL	130	9272

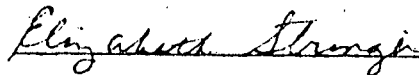
5. The accounts, vouchers, receipts and other records relating to these expenses are in my control at the City of Ottawa.

SWORN BEFORE ME IN THE CITY OF )  
OTTAWA, IN THE REGIONAL )  
MUNICIPALITY OF OTTAWA- )  
CARLETON THIS 28th DAY OF )  
SEPTEMBER, A.D. 1978. )



A. Commissioner etc.

my Commission expires  
6 December 1980





Department  
of Justice

Ministère  
de la Justice

Ottawa, Canada  
K1A 0H8

CONFIDENTIAL

January 18, 1979

209528

Re: Cosmos 954 Satellite Claim  
Against U.S.S.R.

Gentlemen:

For your information I enclose a copy of the "Table of Costs Incurred by the Participating Departments of the Government of Canada in the Search and Recovery Operation for the Cosmos 954 Satellite". The claim will be presented on January 23, 1979 by the Minister of External Affairs to the ambassador for the Soviet Union for the total incremental costs in the amount of \$6,041,174.70.

Yours truly,

Michael A. Kelen  
Civil Litigation Section

Encl.

79.01.25  
Copy to Sgt. Cooper FMB  
JG/r  
RL



- 2 -

cc: Dr. W.K. Gummer  
Manager  
Planning & Coordination Division  
Planning and Administration Br.  
Atomic Energy Control Board

Mr. John F.D. MacIsaac  
Director, Legal Services  
Atomic Energy Control Board

Mr. Raymond Roger  
Legal Adviser  
Atomic Energy Control Board

Mr. G. Artichuk  
Administrative Officer  
Resource Geophysics &  
Geochemistry Division  
Energy, Mines and Resources Canada

Mr. Ron E. Williams  
Director, Legal Services  
Department of Energy, Mines  
and Resources

Mr. J. Milligan  
Acting Director, Legal Services  
Department of Fisheries and  
Environment

Mr. B.T. Lynch  
Officer I/C, Financial Management  
Royal Canadian Mounted Police

Supt. F. Boivin  
Officer I/C, Legal Branch  
Royal Canadian Mounted Police

Mr. Saul Tunis  
Legal Adviser, Legal Services  
Department of National Health  
and Welfare

Mrs. Elizabeth Stringer  
Administrative Officer  
Health Protection Br.  
Health and Welfare Canada

Insp. T.C. Jenkin ✓  
Officer I/C Security  
Royal Canadian Mounted  
Police

Mr. Nick Stevenson  
Senior Financial Advisor  
Financial Services  
Fisheries and Marine  
Service  
Department of Fisheries  
and Environment

Dr. Gerald F. FitzGerald  
Constitutional,  
Administrative and  
International Law  
Department of Justice

TABLE OF COSTS INCURRED BY THE PARTICIPATING DEPARTMENTS  
OF THE GOVERNMENT OF CANADA IN THE SEARCH AND RECOVERY  
OPERATION FOR THE COSMOS 954 SATELLITE

<u>DEPARTMENT</u>	<u>INCREMENTAL COSTS</u>		<u>TOTAL COSTS</u>	
	<u>PHASE I</u>	<u>PHASE II</u>	<u>PHASE I</u>	<u>PHASE II</u>
1. Atomic Energy Control Board	\$433,627.40	\$1,377,603.24	\$496,254.03	\$1,530,828.05
2. Energy, Mines and Resources	\$254,564.14	\$133,393.87	\$295,871.80	\$135,714.07
3. National Defence	\$3,706,765.30	\$110,759.73	\$11,223,549.32	\$243,115.43
4. National Health and Welfare	\$8,759.11	\$5,069.00	\$18,031.11	\$12,247.00
5. Royal Canadian Mounted Police	<u>\$10,632.91</u>	<u>nil</u>	<u>\$14,532.85</u>	<u>nil</u>
Sub Total:	<u>\$4,414,348.86</u>	<u>\$1,626,825.84</u>	<u>\$12,048,239.11</u>	<u>\$1,921,904.55</u>
Total:	<u>\$6,041,174.70</u>		<u>\$13,970,143.66</u>	

BC: jm

G.S. 785-47

CONFIDENTIAL

1979-01-04

Department of Justice,  
West Memorial Building,  
344 Wellington Street,  
Ottawa, Ontario.  
K1A 0H8

Attention: Mr. Michael A. Kelen  
Civil Litigation Section

Dear Sir:

Re: Cosmos 954 Satellite Claim  
Against U.S.S.R.

Receipt is acknowledged of your correspondence  
dated 78-12-28.

Please be advised that no costs were incurred  
by the R.C.M. Police in Phase II of Operation Morning  
Light which was from April 21, 1978 to October 15, 1978.

Yours truly,

B. T. Lynch,  
Officer In Charge,  
Financial Management  
Branch.

29-01-04  
1/13



Department of Justice    Ministère  
of Justice                de la Justice

Ottawa, Canada  
K1A 0H8

December 28, 1978

209528  
Re:    Cosmos 954 Satellite Claim  
       Against U.S.S.R.

Gentlemen:

The claim against the Soviet Union for the costs incurred in Operation Morning Light will be presented to the Soviet Union's ambassador to Canada by the Minister of External Affairs on or about January 15, 1979. At that time it will be necessary to have the total and incremental costs incurred by your department in Phase II of Operation Morning Light which was from April 21, 1978 to October 15, 1978. This information was requested in a letter dated October 25, 1978 to your department from the Department of External Affairs. In that letter it was requested that this information be forwarded to me.

Would you please ensure that the appropriate official at your department advises me by telephone (995-9650) and confirms in writing this information. If your department has not incurred any costs in Phase II please advise in the same manner.

The documentation of the costs in Phase II will be submitted as soon after the January 15th date as possible. As with Phase I it has been decided that the itemization of expenses and the explanation for these expenses from the departments shall be submitted to the Soviet Union in the form of affidavits. I am enclosing a copy of the Affidavit of Mrs. Elizabeth Stringer prepared with respect to the Phase I costs of the Department of National Health and Welfare for your use as a precedent in preparation for the affidavit with respect to your department in Phase II.

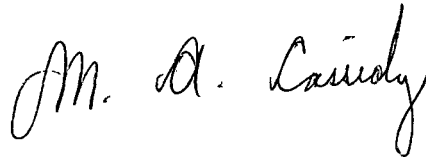
*Contacted FMB  
Sgt. Cooper he had  
who should be had  
taken care of the matter  
as they need a copy  
of the com. direct  
will send me a copy  
of this reply  
19.01.05  
PA 8/2*

. . . / 2

- 2 -

A copy of this letter with enclosures has been sent to the legal services for your department, and I am asking the legal services by copy of this letter to provide any assistance you or the financial officer may require in the preparation of this material.

Yours truly,

A handwritten signature in cursive script, appearing to read "M. A. Kelen".

per: Michael A. Kelen  
Civil Litigation Section

Encl.

- 3 -

Dr. W.K. Gummer,  
Manager,  
Planning & Coordination Division,  
Planning and Administration Branch,  
Atomic Energy Control Board,  
P.O. Box 1046,  
Ottawa, Ontario.  
K1P 5S9

Mr. John F.D. MacIsaac,  
Director,  
Legal Services,  
Atomic Energy Control Board,  
270 Albert Street, 7th Floor,  
Ottawa, Ontario.  
K1P 5S9

Mr. Raymond Roger,  
Legal Adviser,  
Atomic Energy Control Board,  
7th Floor,  
270 Albert Street,  
Ottawa, Ontario.  
K1P 5S9

Mr. G. Artichuk,  
Administrative Officer,  
Resource Geophysics &  
Geochemistry Division,  
Energy, Mines and Resources Canada,  
Science and Technology,  
Geological Survey of Canada,  
601 Booth Street, Room 568,  
Ottawa, Ontario.  
K1A 0E8

Mr. Ron E. Williams,  
Director,  
Legal Services,  
Department of Energy Mines  
and Resources,  
Room 2015 "B", 580 Booth Street,  
Ottawa, Ontario.  
K1A 0E4

Mr. Brahm Levin,  
Director,  
Budget Preparation and Control Br.,  
Department of Fisheries and  
Environment,  
7th Floor, Fontaine Bldg.,  
Hull, Quebec.

Mr. J. Milligan,  
Acting Director,  
Legal Services,  
Department of Fisheries and  
Environment,  
10th Floor, Fontaine Bldg.,  
200 boul Sacré-Coeur,  
Hull, Quebec. K1A 1C7

The Commissioner,  
Royal Canadian Mounted Police,  
Room 620, Pickering Bldg.,  
250 Tremblay Road,  
Ottawa, Ontario.

Attention: Mr. B.T. Lynch  
Officer I/C  
Financial  
Management Br.

Royal Canadian Mounted Police,  
Headquarters,  
1200 Alta Vista Drive, Rm G-207,  
Ottawa, Ontario. K1A 0R2

Attention: Supt. F. Boivin  
Officer I/C  
Legal Branch

Mr. Saul Tunis,  
Legal Adviser,  
Legal Services,  
Department of National Health  
and Welfare,  
343 Jeanne Mance Bldg., Rm 346,  
Tunney's Pasture,  
Ottawa, Ontario.  
K1A 0K9

Mrs. Elizabeth Stringer,  
Administrative Officer,  
Health Protection Branch,  
Radiation Protection Bureau,  
Health and Welfare Canada,  
Brookfield Road,  
Ottawa, Ontario.  
K1A 1C1

- 4 -

Mrs. Shirley T. Parks,  
Director,  
Legal Services,  
Department of Indian and Northern  
Affairs,  
22nd Floor, Les Terrasses de la  
Chaudière,  
10 Wellington Street,  
Hull, Quebec.  
K1A OH4

Royal Canadian Mounted Police,  
Headquarters,  
1200 Alta Vista Drive,  
Ottawa, Ontario.  
K1A OR2

Attention: Inspector T.C. Jenkin, ✓ Officer I/C, Security

Mr. Nick Stevenson,  
Senior Financial Advisor,  
Financial Services,  
Fisheries and Marine Service,  
Department of Fisheries and Environment,  
240 Sparks Street,  
Ottawa, Ontario.  
K1A OE6

Mr. Glen R. Sheppy,  
Legal Operations (FLA),  
Department of External Affairs,  
Room A4-158,  
L.B. Pearson Building,  
125 Sussex Drive,  
Ottawa, Ontario.  
K1A OG2

Mr. W.H. Montgomery,  
Director,  
Legal Advisory Division,  
Department of External Affairs,  
4th Floor, Room 140,  
125 Sussex Drive, Tower "A",  
Ottawa, Ontario.  
K1A OG2

Dr. Gerald F. FitzGerald,  
Department of Justice, Room 624

Mr. F.J.E. Jordan,  
Department of Justice, Room 625

Mr. Daniel K. Daley,  
Articling Student, Department of Justice

OIC LIAISON BRANCH

HQ-485-35

OIC SECURITY SYSTEMS BRANCH

19-12-78

COSMOS 954 - CLAIM  
AGAINST THE USSR

Attached is a self-explanatory letter from the Assistant Under-Secretary of State for External Affairs, dated 78 Dec 14 regarding Cosmos 954.

2. As you may be aware, the Force was involved to a limited extent in the cleanup operation of Cosmos 954 in the Northwest Territories. As pointed out by Mr. Taylor, the Canadian Government is about to press a claim against the USSR and, should anyone enquire into this incident, i.e. Cosmos 954 and/or the claim, they should be referred to the Secretary of State for External Affairs.

*JF 78.12.20*

F.F. Fedor, Supt.  
OIC Security Systems Branch

Att.

cc: DCI (Federal Policing Branch);  
C.O. "G" - Yellowknife

cc: File HQ-485-35  
Letterbook

*JF 12*  
*PA*  
*78-12-20*



Office of  
The Under Secretary of State  
for External Affairs



Cabinet du  
Sous-Secrétaire d'Etat  
aux Affaires extérieures

OTTAWA K1A 0G2

December 14, 1978

Dear Inspector Jenkin,

The Prime Minister and most of the Ministers to whom the Memorandum and annexed legal studies on the Cosmos 954 claim were submitted have now approved the proposals made by officials contained in this material. Pursuant to the agreement reached at the meeting of the Interdepartmental Committee on Cosmos 954 held on September 29, 1978, officials in the Department of Justice and this Department have been preparing the actual claim document.

As we approach the time when the claim will be presented to the USSR, and in the expectation of a period of diplomatic negotiations on the claim, you will appreciate the need for caution in public statements. There should be one voice for statements on the claim in order to prepare most effectively for presentation of the case to the USSR. As this Department will have the primary responsibility for conducting the negotiations with the USSR, it should also have the responsibility of responding to all future inquiries on the claim. For this reason, I am asking for the cooperation of all Departments and Agencies that have been involved in aspects of work on the claim to ensure that inquiries with respect to the status of the claim are referred to the Secretary of State for External Affairs or this Department, as appropriate, for consideration and reply.

If representatives of your Department are pressed to answer inquiries, they could respond that as the claim will soon be the subject of diplomatic negotiations between Canada and the USSR, all comments about it are being handled by the Department of External Affairs.

Yours sincerely,

A handwritten signature in cursive script, appearing to read "J.H. Taylor".

J.H. Taylor  
Assistant Under-Secretary

Inspector T.C. Jenkin  
Office in Charge  
Security Policy Section  
Security Systems Branch  
RCMP  
Vedic Building, Room 118  
720 Belfast Road  
OTTAWA K1A 0R2

ON HER MAJESTY'S SERVICE  
SERVICE DE SA MAJESTÉ

CANA  
POSTAGE PAID  
PORT PAYÉ

DEC 18 1978

Inspector T.C. Jenkin  
Office in Charge  
Security Policy Section  
Security Systems Branch  
RCMP  
Vedic Building, Room 118  
720 Belfast Road  
OTTAWA K1A 0R2

"By Hand -

FLA/047"

EXTERNAL AFFAIRS

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Office of  
The Under Secretary of State  
for External Affairs



Canada

Cabinet du  
Sous-Secrétaire d'Etat  
aux Affaires extérieures

PLEASE ADDRESS  
CORRESPONDENCE TO:

THE COMMISSIONER  
ROYAL CANADIAN MOUNTED POLICE  
OTTAWA, CANADA  
K1A 0R2



HEADQUARTERS  
DIRECTION GÉNÉRALE

PRIÈRE D'ADRESSER LES  
LETTRES COMME SUIT:

LE COMMISSAIRE  
GENDARMERIE ROYALE DU CANADA  
OTTAWA, CANADA  
K1A 0R2

YOUR NO. FLA 1185  
VOTRE N°  
OUR NO. HQ-485-35  
NOTRE N°

BY HAND

1978 December 18

CONFIDENTIAL

Mr. W.H. Montgomery,  
Director,  
Legal Advisory Division,  
Dept. of External Affairs,  
4th Floor Tower "A",  
Lester B. Pearson Bldg.,  
125 Sussex Drive,  
Ottawa K1A 0G2

Dear Mr. Montgomery:

Re: Cosmos 954 - Claim Against the USSR

This refers to your letter of 1978 October 25 and  
Memorandum to Ministers dated 1978 October 18.

The Honourable Jean-Jacques Blais, Solicitor General  
of Canada, has reviewed the Memorandum to Ministers  
and agrees with the recommendations and proposed course  
of action.

Attached is a copy of the Solicitor General's letter  
dated 1978 December 04 for your record.

Yours truly,

T.C. Jenkin, Insp.,  
Officer in Charge  
Security Policy Section,  
Security Systems Branch

Att.

TCJ/vmh

cc: File HQ-485-35  
Letterbook

000000

*Supt Schumann,  
As requested  
Carole  
15/12/78*

with the  
compliments of

avec les  
hommages de

**Maureen Boyd**

Executive Assistant

Chef de cabinet



Office of the  
Solicitor General of Canada

Cabinet du  
Solliciteur général du Canada

000000



Solicitor General of Canada  
Solliciteur général du Canada

PA.

OTTAWA K1A 0P8

DEC 4 1978

Commissioner R.H. Simmonds  
Royal Canadian Mounted Police  
1200 Alta Vista Drive  
Ottawa, Ontario

Dear Commissioner Simmonds:

Re: Operation Morning Light - Cosmos 954  
Claim Against the U.S.S.R.

I have reviewed the memorandum of the Interdepartmental Committee on Cosmos 954 dated October 18, 1978 and attached to your letter of November 1.

I agree with the recommendations and proposed course of action.

Yours sincerely,

Jean-Jacques Blais

Jean-Jacques Blais



Government  
of Canada

Document disclosed under the Access to Information Act -  
Document divulgué en vertu de la Loi sur l'accès à l'information

Gouvernement  
du Canada

ACTION  
REQUEST

FICHE DE  
SERVICE

TO - À

S/S/M Brewer

FILE NO. - DOSSIER N°

DATE

79-01-10

FROM - DE

KS.

☐ PLEASE CALL  
PRIÈRE D'APPELER

TEL. NO. - N° DE TEL.

EXT. - POSTE

☐ WANTS TO SEE YOU  
DÉSIRE VOUS VOIR

DATE

TIME - HEURE

☐ WILL CALL AGAIN  
DOIT RAPPELER

CALL RECEIVED BY  
MESSAGE REÇU PAR

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DONNER SUITE

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APPROBATION

☐ NOTE & RETURN  
NOTER ET RETOURNER

☐ COMMENTS  
COMMENTAIRES

☐ DRAFT REPLY  
PROJET DE RÉPONSE

☐ NOTE & FORWARD  
NOTER ET FAIRE SUIVRE

☐ MAKE  
FAIRE ----- COPIES

☐ SIGNATURE

☐ NOTE & FILE  
NOTER ET CLASSER

As requested

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in the laboratory, the solution was lying on the hearth rug.

The canine nose is not a new weapon in seek-and-fetch exercises. Mr. Avery says he got his idea while "sitting around the coffee pot with an RCMP officer trading stories about how dogs are trained to sniff out narcotics." A third member of the party, a Calgary gas official, suggested it was too bad he could not train them to sniff out gas leaks.

"That was enough for me."

He heard there was a man in Windsor working along the same lines, but could get no information on the experiment and so he had to chart his own course.

From a friend Mr. Avery got some mercaptan, the substance added to natural gas to give it its unmistakable odor. In its undiluted state, its aroma is crushing.

He selected what he hoped was the brains of his kennel of black Labradors — Jackie — and six months ago they began a slow and deliberate training program. After Jackie learned to fetch, Mr. Avery introduced her to mercaptan, rubbing a small amount on a ball or stick, burying it, then setting Jackie free to track it.

Document disclosed under the Access to Information Act -  
Document divulgué en vertu de la Loi sur l'accès à l'information

Mr. Avery said. "The break was 10 feet across and she defined the area by digging a hole at both ends, and another one in the middle."

Her next job was to patrol a 290-kilometre section of pipeline near Provost. "They thought there might have been more than one leak in the distance. Jackie found 40 of them."

Jackie has even gone head-to-head against a gas detection machine. Mr. Avery said the machine "found a few that Jackie didn't, but she found a lot more that it had missed." And "there's no doubt in the minds of those there who the winner was."

Jackie's greatest attribute is that her nose will work in the wind, rain, dust and the dark. Also, because she likes to wander a bit, she covers a strip five metres wide while a machine must be directly over a line to detect leakage. This gives the dog an edge in patrolling lines laid in snake-like loops.

Mr. Avery said a two-man, one-dog team can cover 16 kilometres of loop line a day, or 50 kilometres of straight line. He charges \$45 a mile for a loop run, \$36 for a straight run, and has a daily rate of \$200 plus expenses — including dogfood.

# Why should Canada pay?

E. q. E

We find it hard to believe the Canadian government will likely bill the Russians for less than half the actual costs involved in cleaning up remains of the Soviet Cosmos-954 satellite that plunged to earth in the Northwest Territories last Jan. 24.

That startling fact came out of an exchange during questioning before the Commons national resources committee in Ottawa last week. An official of the Atomic Energy Control Board, the federal nuclear regulatory agency, said the total cost will be about \$13.7 million.

But the federal government will only claim from the Russians \$6.1 million, described as the incremental costs involved — included would be additional travel, overtime or rental of equipment, but not regular salaries or use of equipment owned by our government.

THE LONDON FREE PRESS London, Ontario  
November 29, 1978

We side with MP John Crosbie (PC-St. John's West), who at hearing the government plans, said he hoped Energy Minister Alastair Gillespie would "stiffen the backs of external affairs to make decent claims against the U.S.S.R."

Crosbie went on to say that, "When somebody dumps a radioactive satellite on my territory, I don't have to be too timid in putting forward claims."

Detente and other relations aside, Canadian taxpayers shouldn't be made to foot any portion of the cleanup bill for a Soviet satellite that came in from the cold.

HQ 485-35



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E. 9-E

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Detente and other relations aside, Canadian taxpayers shouldn't be made to foot any portion of the cleanup bill for a Soviet satellite that came in from the cold.

HQ 485-35

J 79. 07. 22

Document  
Canada

Gouvernement  
du Canada

ACTION  
REQUEST

FICHE DE  
SERVICE

TO: 2

FILE NO. - DOSSIER N°

Insp. Jenkin

DATE

78-12-01

FROM - DE

Glen Sheppy  
External Affairs

<input type="checkbox"/> PLEASE CALL PRIÈRE D'APPELER	TEL. NO. - N° DE TEL 2-2486	EXT. - POSTE
<input type="checkbox"/> WANTS TO SEE YOU DÉSIRE VOUS VOIR	DATE	TIME - HEURE
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CALL RECEIVED BY MESSAGE REÇU PAR ►		
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<input type="checkbox"/> COMMENTS COMMENTAIRES	<input type="checkbox"/> DRAFT REPLY PROJET DE RÉPONSE	<input type="checkbox"/> NOTE & FORWARD NOTER ET FAIRE SUIVRE
<input type="checkbox"/> MAKE FAIRE _____ COPIES	<input type="checkbox"/> SIGNATURE	<input type="checkbox"/> NOTE & FILE NOTER ET CLASSER

Mr. Sheppy is sending you an urgent  
"By Hand" copy of a letter to his  
Director, Mr. Montgomery, by the  
Dept. of Justice. Some Ministers, as  
yet, have not given approval. He  
would appreciate it if you could check  
with the Solicitor General's office to  
see what is happening, and at what  
stage the Memorandum is.

*Mr. Bessonnelle's*  
*Secretary*  
*Suzanne*  
*5-8237*

78/12/1 4:05 PM

- Minister has reply for signature  
- should be soon.

= left message with Chapin HQ 485-35

Mr. Montg. - write him -

1978 November 01

Talk to Sh. on 78.12.04

CONFIDENTIAL

The Honourable Jean-Jacques Blais, P.C., M.P.,  
Solicitor General of Canada,  
Ottawa, Ontario

Dear Mr. Blais:

Re: Operation Morninglight - Cosmos 954 -  
Claims Against the U.S.S.R.

You may recall that a member of the Force was appointed to represent your department and the R.C.M. Police on the Interdepartmental Committee on Cosmos 954. The Committee's mandate was to consider the practicality of seeking damages from the U.S.S.R. for costs incurred as a result of the nuclear-powered Cosmos 954 satellite incident.

The Committee concluded that there is a legal basis for a Canadian claim for compensation against the U.S.S.R. Accordingly, the attached Memorandum to Ministers, setting out the Committee's recommendations and proposed course of action, is being presented to each of the Ministers represented on the Interdepartmental Committee for consideration and approval.

I am informed that the Prime Minister is also being presented a copy of the Memorandum to Ministers by the Secretary of State for External Affairs.

Your early consideration of this memorandum will be appreciated.

Yours truly,

R. H. Simmonds,  
Commissioner

Att.

TCJ/vmh  
cc: File HQ 485-35  
Letterbook



WITH THE COMPLIMENTS  
OF THE  
DEPARTMENT  
OF  
EXTERNAL AFFAIRS

AVEC LES HOMMAGES  
DU  
MINISTÈRE  
DES  
AFFAIRES EXTÉRIEURES

December 1, 1978

W.H. Montgomery

ECON 19/65

78110307



Department  
of Justice

Ministère  
de la Justice

Ottawa, Canada  
K1A 0H8

November 29, 1978

DATE	781130	REF
ACC	5672	DOSSIER
FILE	66-7-LEGAL	
BY HAND		PAR PORTEUR
ATTN:		

Mr. W.H. Montgomery  
Director, Legal Advisory Division  
Department of External Affairs  
Ottawa, Ontario  
K1A 0G2

Dear Mr. Montgomery:

Re: COSMOS 954 - Claim against the U.S.S.R.

I understand that, a few days ago, Mr. F.J.E. Jordan spoke to you about the above-mentioned matter and that some departments had not, at that time, approved the recommendations of the Interdepartmental Committee on COSMOS 954.

As we all know, the deadline of January 24, 1979 for submission of the claim is fast approaching. Hence, there could be complications if, only at a late date, a decision were taken to make a claim for total (and not merely incremental) costs, since the relevant affidavits would have to be revised. In this regard, it is necessary to bear in mind the possibility that potential deponents may be unavailable during the holiday period.

At all events, I would suggest that we set December 20, 1978 as our target date for completion of: (a) the claim in final form and (b) the draft press release.

Yours very truly,

Gerald F. FitzGerald, Q.C.  
Constitutional, Administrative  
and International Law Section

/mc

c.c.: Mr. Kelen

C.O. "G" - YELLOWKNIFE

HQ-485-35

OIC SECURITY POLICY SECTION

'P' DIRECTORATE

78-11-03


"Operation Morninglight"

Enclosed is a D.N.D. film covering the highlights of "Operation Morninglight" for your viewing and retention.

2. D.N.D. has supplied copies of this film to all agencies which participated in this operation. It may prove of interest to those of your staff who were involved.

Encl.

TCJ/vmh

  
T.C. Jenkin, Insp.,  
OIC Security Policy Section,  
Security Systems Branch

cc: File HQ-485-35  
Letterbook

HQ 485-35

1978 November 01

CONFIDENTIAL

The Honourable Jean-Jacques Blais, P.C., M.P.,  
Solicitor General of Canada,  
Ottawa, Ontario

Dear Mr. Blais:

Re: Operation Morninglight - Cosmos 954 -  
Claims Against the U.S.S.R.

You may recall that a member of the Force was appointed to represent your department and the R.C.M. Police on the Interdepartmental Committee on Cosmos 954. The Committee's mandate was to consider the practicality of seeking damages from the U.S.S.R. for costs incurred as a result of the nuclear-powered Cosmos 954 satellite incident.

The Committee concluded that there is a legal basis for a Canadian claim for compensation against the U.S.S.R. Accordingly, the attached Memorandum to Ministers, setting out the Committee's recommendations and proposed course of action, is being presented to each of the Ministers represented on the Interdepartmental Committee for consideration and approval.

I am informed that the Prime Minister is also being presented a copy of the Memorandum to Ministers by the Secretary of State for External Affairs.

Your early consideration of this memorandum will be appreciated.

Yours truly,

R. H. Simmonds,  
Commissioner

Att. 

TCJ/vmh

cc: File HQ 485-35  
Letterbook

000000

CONFIDENTIAL

October 18, 1978

MEMORANDUM TO MINISTERS

FROM: CHAIRMAN, INTERDEPARTMENTAL COMMITTEE  
ON COSMOS 954

SUBJECT: COSMOS 954 - CLAIM AGAINST THE USSR

Introduction

The purpose of this memorandum is to place before you the recommendations of the Interdepartmental Committee having responsibility for the preparation of the claim against the USSR in connection with the COSMOS 954 incident. The recommendations are based on the conclusions of legal advisers of the departments concerned, and are directed to obtaining your approval of the course of action to be followed in submitting the claim to the Soviet Union.

2. Fragments from the nuclear-powered COSMOS 954 satellite entered Canada on January 24, 1978. The search for the radioactive debris of COSMOS 954 began almost immediately. During the operations, substantial assistance was rendered by USA authorities. The work of search, recovery, removal, testing and clean-up has given rise to costs incurred by the Atomic Energy Control Board and the Departments of National Defence, Energy, Mines and Resources, Health and Welfare and the Solicitor General. Costs incurred up to April 20, 1978, the date on which lead responsibility in the operations shifted from DND to AECB, and excluding USA costs, amount to approximately \$12,000,000 total of which some \$4,600,000 are incremental costs: i.e. costs that would not have been incurred had the COSMOS 954 incident not taken place. (USA costs are approximately \$3,000,000 and \$2,000,000 respectively.) Costs have also been incurred since April 20, 1978, and will continue to be incurred until the search for radioactive elements of COSMOS 954 is terminated. As a result of these operations, many radioactive fragments were recovered including two fragments which, if not recovered, could have caused serious injury to any person coming into contact with them at any time during the

.../2



- 2 -

CONFIDENTIAL

next several years. There is also the question of compensation for damage to persons and property that may be identified. To date, however, no such damage has been identified although the claim will reserve the right to claim for such damage in future.

3. Canada informed the USSR on February 28, 1978, that a claim for damages, including search and recovery costs, would be submitted as a result of the presence on Canadian territory of hazardous component parts of the satellite COSMOS 954.

#### Issues

4. There are three principal issues which Ministers are requested to address on the basis of information and advice set forth below:

- (A) Legal Basis of Canada's Claim;
- (B) Costs Eligible for Inclusion in the Claim, and
- (C) Disposition of USA Costs.

#### (A) Legal Basis of Canada's Claim<sup>1</sup>

5. The Interdepartmental Group of Legal advisers considers that sufficient proof exists to establish that the satellite debris collected during the operations comes from the Soviet satellite COSMOS 954. On review of the relevant legal aspects, legal advisers consider that a claim by Canada for compensation should be based primarily on the absolute liability provision of the 1972 Convention on International Liability for Damage Caused by Space Objects, to which both Canada and the USSR are parties, supported as necessary by general principles of international law. This Convention is directed specifically to liability for damage, as defined therein, and the provision of a full and equitable measure of compensation for such damage.

6. The advantages of the Convention are that the launching state is absolutely liable without proof of fault and that the Convention provides for: (a) determination of the amount of compensation, (b) negotiations with a view to settlement of the claim, and (c) if necessary, the establishment of a Claims Commission to consider the claim and render a final and recommendatory award. The major disadvantage of the Convention is that

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1. See Annex A for a more detailed presentation.

.../3

- 3 -

CONFIDENTIAL

it may be argued that damage under the Convention, on a narrow interpretation, is restricted to physical damage, the relevant text of the Convention being as follows:

"...loss of life, personal injury or other impairment of health; or loss of or damage to property of States or persons..." (Article I(a))

7. For Canada's claim to succeed under the Convention, the term "damage" in Article I(a) must receive a broad interpretation to encompass the situation where the presence of hazardous radioactive COSMOS 954 debris on Canadian territory not only caused immediate damage by nuclear contamination rendering Canadian property unusable, but also created such a clear and immediate apprehension of damage to persons and property as to justify the incurring of substantial costs involved in the search, recovery, removal, testing and clean-up of the fragments of the satellite. This would be in accordance with the duty of Canada, like any other plaintiff, to mitigate the damages as defined. In fact, the results of the operations have shown that radioactive satellite fragments, some of them of a lethal character, were found on Canadian property and rendered that property unusable. The USSR, on the other hand, will probably contend that the mere presence of the fragments did not cause "damage" within the meaning of the Convention. It is by no means certain, therefore, that Canada's claim will prevail.

8. A second basis of Canada's claim is to be found in the general principles of international law concerning state responsibility. It can be argued that one such principle is that strict liability should apply to activities that are abnormally dangerous. However, this argument may be difficult to establish in the absence of any precedent.

9. A third basis is that the intrusion of COSMOS 954 into Canadian territory constitutes a breach of sovereignty. In the circumstances of the claim, compensation for such a breach would likely be nominal.

(B) Costs Eligible for Inclusion in the Claim<sup>2</sup>

10. The Interdepartmental Group of Legal Advisers has considered the question of proceeding on the basis of including

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2. See Schedule of Costs attached hereto for a summary of costs incurred and Annex B for a more detailed discussion of the basis for claiming costs.

.../4

total costs or only incremental costs. The Group has concluded that under both the Convention and general principles of international law, Canada is able to include in the claim only such costs of search, recovery, removal, testing and clean-up of COSMOS 954 debris as are consistent with the principle of restitutio in integrum, namely, costs which would not have been incurred except for the COSMOS 954 satellite incident. These costs are in general known as incremental costs and may be included provided they are reasonable, proximately caused by the incident and capable of being calculated with a reasonable degree of certainty. In consultation with the Group, the interested Departments and agencies continue to review the costs incurred to permit a final preparation of the Schedule of Costs consistent with an agreed view as to the meaning of "incremental costs".

(C) Disposition of USA Costs<sup>3</sup>

11. The offer of assistance by the USA was not made contingent upon reimbursement, nor conditioned upon incorporation of the USA costs in any Canadian claim against the USSR. Thus, there is no legal obligation on Canada to reimburse the USA for costs incurred by the latter and therefore no legal basis exists for Canada to advance a claim on behalf of the USA. Moreover, it must be noted that Canada did not take up a Soviet offer of assistance made after the USA offer had been accepted and acted upon. Nevertheless, policy considerations (such as preserving equity and equality in our relations with the USA) may suggest that, ultimately, a portion of any costs recovered from the USSR be distributed to the USA on an ex gratia basis. This would be for consideration when the outcome of the claim is known.

Conclusions

12. In the light of the foregoing and on the basis of the legal studies set forth in Annexes A, B and C hereto, the following conclusions may be drawn with respect to the claim:

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3. See Annex C for a more detailed presentation.

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CONFIDENTIAL

- (A) There is a legal basis for a Canadian claim for compensation against the USSR, the validity of which, however, can be expected to be challenged on the interpretation to be given to the meaning of "damage" under the 1972 Convention and on the applicability of general principles of international law;
- (B) There are limitations on the costs of search, recovery, removal, testing and clean-up that may be included in the claim and the best legal view is that only incremental costs may be included;
- (C) There is no legal basis for including USA costs in the claim, although ultimately there may be policy grounds for distributing to the USA on an ex gratia basis, a portion of the proceeds of a successful claim.

#### Recommendations

13. It is recommended that Canada proceed with a claim against the Soviet Union:

- (A) on the basis of the absolute liability provision of the 1972 Convention on International Liability for Damage Caused by Space Objects, supported as necessary by general principles of international law;
- (B) on the basis of the recovery of incremental costs; and
- (C) excluding USA costs.

#### Course of Action

14. The course of action to be followed would include:

- (A) the submission of a formal claim to the Soviet Union, covering insofar as costs are concerned Phase I of the operations. Canada has one year

.../6

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CONFIDENTIAL

from January 24, 1978, the date of the incident, to submit the claim under the terms of the 1972 Convention. The claim would be submitted, however, as soon as preparations are completed and would be followed by a supplementary claim covering the incremental costs of Phase II of the operations. The claim would reserve the right to claim for damage which, given the nature of nuclear radiation, may become evident only at a later date.

There would not appear to be any political considerations militating against submission of the claim as early as November. Canadian-Soviet relations have gradually improved since the expulsion of the 13 espionage agents in February and it is possible the Soviet Government will wish to dispose of the issue quickly to minimize further public embarrassment. Nor would such timing jeopardize Canadian interests in other dealings with the USSR. By the time the claim is submitted, discussions on a UN General Assembly Resolution supported by Canada proposing the establishment of an expert working group to study the technical and safety aspects of the use of nuclear power sources in outer space are likely to have been concluded and ministerial-level trade talks under the aegis of the Canada/USSR Mixed Economic Commission will have been held.

- (B) negotiations with the Soviet Union on the substance of the claim for a period of up to one year, with the objective of reaching a settlement between Canada and the Soviet Union on the claim. The terms of the settlement would be submitted to Ministers for approval.
- (C) in the event of failure to achieve a bilateral settlement within one year, Canada would be in a position to request the establishment of a Claims Commission under the terms of the 1972 Convention. It is envisaged that Ministers would wish to review the Canadian position prior to the making of the request to establish

.../7

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CONFIDENTIAL

a Claims Commission, and would wish to take decisions on matters such as the naming of the Canadian member, the selection of the neutral or third member, the nature of the Canadian submission to the Commission and the costs and other requirements for Canada of a lengthy international arbitration before a Claims Commission.

15. Do you agree with;

- (A) the recommendations on the COSMOS 954 claim; and
- (B) the course of action proposed?

A.E. Gotlieb  
Under-Secretary of State  
for External Affairs

# SCHEDULE OF COSTS

## 1. STATEMENT OF TOTAL AND INCREMENTAL COSTS

(January 24 - April 20, 1978)

<u>Department or Agency</u>	<u>Total Costs</u>	<u>Incremental Costs</u>
DND		
a) Personnel Costs (military and civilian)	2,200,030.31	588,370.53
b) Aircraft Costs	7,375,916.53	2,216,252.52
c) Fees paid to non DND agencies	205,373.87	205,373.87
d) Material Costs	535,234.72	481,686.81
e) Transportation of personnel and Rental of Facilities	37,556.06	20,302.75
f) Miscellaneous Costs	3,691.43	3,691.43
g) Cost of DND Administration	1,035,780.29	351,567.79
Total:	11,393,583.21	3,867,245.70
HEALTH AND WELFARE	18,031.11	8,759.11
R.C.M.P.	14,532.85	10,632.91
E.M.R.	295,871.80	254,564.14
A.E.C.B.	496,254.03	433,627.40
Total:	12,218,273.00	4,574,829.26

The above figures are subject to revision by the departments and agencies concerned.

A N N E X A

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COSMOS 954 SATELLITE - CLAIM AGAINST THE USSR

Legal Basis of Canada's Claim: Nature of Damage

1. In this study there is an examination of the question whether such damage has been caused in Canada by COSMOS 954 as could give rise to a claim for compensation by Canada against the USSR. Here, it is seen that Canada's claim against the USSR for compensation in respect of the intrusion of the nuclear-powered COSMOS 954 satellite into Canada and its break-up in Canada in January 1978, rests primarily, but not exclusively, on the Convention on International Liability for Damage Caused by Space Objects, 1972 (the 1972 Liability Convention) and other instruments pertaining to outer space. Although the 1972 Liability Convention is directly relevant to the claim, it is not exhaustive of the applicable rules of international law. In this regard, it is observed that the mere entry of the satellite into Canada was a breach of Canadian sovereignty and, therefore, constituted an international wrong.

2. The obvious heads of damage that normally fall for consideration in a case like the present one are wrongful death or personal injury, or loss of or damage to property. However, due to the hazardous and deleterious nature of the nuclear material on board the satellite and the disintegration of the satellite over a wide area, substantial costs have been incurred in searching for, recovering, removing, testing and cleaning up debris from the satellite. For that reason, in the discussion below, emphasis is placed on ascertaining the legal basis for claiming such costs, whether under the 1972 Liability Convention or otherwise.

3. Article II of the 1972 Liability Convention provides that the launching state "shall be absolutely liable to pay compensation for damage caused by its space object on the surface of the earth...". Article I(a) of the 1972 Liability Convention defines "damage" as meaning "loss of life, personal injury or other impairment of health; or loss or damage to property of States or of persons, natural or juridical, or property of international intergovernmental organizations". As the definition of damage does not contain qualifications, it can be interpreted to include nuclear damage. This is confirmed by positions taken during negotiations that led to the preparation of the Convention. Therefore, a reading of

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CONFIDENTIAL

Articles II and I(a) together indicates that the USSR, as the launching state, is absolutely liable to pay compensation to Canada for damage, including nuclear damage, caused by debris from the COSMOS 954 satellite.

4. The intrusion of a nuclear-powered satellite into Canada and its disintegration therein gave rise to a clear and immediate apprehension of the likelihood of damage, including nuclear damage, to persons and property. Hence, Canadian authorities were under a duty to take immediate steps for the search, recovery, removal, testing and clean-up of the fragments from the satellite. This duty was one that had to be carried out pursuant to domestic law for the protection of Canada. It was also necessary for Canada, under international law, to mitigate damages<sup>1</sup> which would be claimed against the owner of the satellite, namely, the USSR. As a result of the steps taken by Canada it has been found that discrete fragments of the satellite and pieces of the outer structure of the nuclear reactor on board the satellite, comprising twisted metal, pipe fragments, rods and the like, all of which, with one exception, were radioactive, caused damage by rendering Canadian property unusable until the debris was located and removed. In addition, there existed a clear and immediate apprehension of the likelihood of more serious kinds of damages due to the presence of a nuclear reactor on board the COSMOS 954 satellite. In particular, it has been confirmed, on the basis of radioactive contamination from a highly radioactive piece of debris located on the McLeod Bay ice surface and from small, dust-like particles found on Canadian property, that the residue of the disintegrated nuclear reactor core, has entered the fragile ecology of northern Canada thereby causing radiation damage. In short, the steps taken by Canada disclosed the presence of radioactive satellite debris, some of which was of a lethal character, on Canadian property, which rendered that property unusable. There is also the risk of additional radiation damage in the future as the contamination spreads further into the human and natural environment. In this regard, it will be important to leave the door open to the possibility of making future claims in respect of damage to persons and property.

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1. United States v. Nicaragua, 1900 For. Rel. 824, at 826-833;  
Portuguo-German Arbitration (1928-30) U.N. Rep., Vol. II, 1011

.../3

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CONFIDENTIAL

5. The operations were made more complicated because the USSR failed in its duty under international law by not giving, in timely fashion or with sufficient detail, information adequate to allay Canadian apprehensions of damage from the satellite which had been reported to contain, and did contain, material of a hazardous or deleterious nature.

6. Canada's claim against the USSR may also be founded on international instruments other than the 1972 Liability Convention and on general principles of international law. Briefly, pursuant to Article VII of the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies (1967), or the principles of international law, the USSR is liable for damage caused by COSMOS 954 or its component parts to Canada or Canada's natural or juridical persons. It can be argued that it is "a general principle of law recognized by civilized nations" (see Article 38 of the Statute of the International Court of Justice) that in the case of activities that are abnormally dangerous, for example, outer space activities involving the use of nuclear-powered satellites, the operator of such an activity is strictly liable for damage caused thereby. In this regard it is noted that the USSR was, at all material times, pursuant to the second sentence of Article VIII of the 1967 Treaty, the owner of the COSMOS 954 Satellite or the component parts thereof which returned to Earth in Canada and as such cannot avoid liability with respect to damage caused by COSMOS 954 or its component parts by purporting to renounce ownership thereof.

7. It remains to consider the question of the violation of Canada's sovereignty by the intrusion of the COSMOS 954 satellite. The intrusion of the satellite constitutes an international wrong per se and it is not necessary, in order for Canada to claim compensation, to prove that the intrusion caused damage to persons or property. The act of intrusion itself (analogous to an act of trespass in domestic law) gives rises to compensation. A nominal amount may be claimed under this head.

A N N E X B

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COSMOS 954 SATELLITE - CLAIM AGAINST THE USSR

Costs Eligible for Inclusion in the Claim

1. This study focuses on the question of the extent to which Canada can include costs of search, recovery, removal, testing and clean-up in its claim against the USSR. This question must be determined in the light of the principle of restitutio in integrum which is reflected in Article XII of the 1972 Liability Convention and the statement of the Permanent Court of International Justice in the Chorzow Factory Case (1928)\*. Article XII of the Convention thus provides that the compensation

"shall be determined in accordance with international law and the principles of justice and equity, in order to provide such reparation in respect of the damage as will restore...the person.../or/ State... to the condition which would have existed if the damage had not occurred."

Similarly, if the USSR is liable to pay compensation to Canada, the measure of such compensation is established by the Chorzow Factory case in which the Permanent Court of International Justice reflected the principle of restitutio in integrum in the following statement:

"The essential principle contained in the actual notion of an illegal act - a principle which seems to be established by international practice and in particular by the decisions of international tribunals - is that reparation must, as far as possible, wipe out all the consequences of the illegal act and reestablish the situation which would, in all probability, have existed if that act had not been committed."

2. It has already been seen in Annex A that there is a legal argument for a Canadian claim for the costs of operations of search, recovery, removal, testing and clean-up. Here, it is recalled that Canada observed its duty in law, both domestic and international, to mitigate the damage which had been occasioned and which it apprehended could be caused by the nuclear-powered satellite, and incurred substantial costs in carrying out the related operations.

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\* P.C.I.J., Ser. A, No. 17 (1928).

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CONFIDENTIAL

3. The USSR may argue that even if Article XII of the 1972 Liability Convention embodies the principle of restitutio in integrum, the costs of search, recovery, removal, testing and clean-up are not properly recoverable under Article XII. In this regard, the Canadian reply would be that it is within the letter and spirit of Article XII, as well as within the recognized principles of international law, that a claimant state may recover all costs that have been incurred by it due to the intrusion of the satellite. Because of the hazardous and deleterious material on board the satellite and the apprehension that there could have been wide-spread radiation damage, it was necessary for Canada to undertake the costly operations that were undertaken. Some highly radioactive material was found and the operations carried out obviated a need for placing a large area of Canada off limits or under restricted use, steps which could have given rise to unknown damages.

4. The best legal view is that, in the application of the principle of restitutio in integrum, costs for inclusion in the claim are limited to incremental costs, i.e. those which would not have been incurred except for the COSMOS 954 satellite incident. Hence, the claim cannot include costs which would have been incurred in any event regardless of the COSMOS 954 incident. Incremental costs, however, may be considered to include tangible, quantifiable losses caused by the diversion of resources from normal tasks to duties related to the COSMOS 954 satellite incident, even though the costs thereby incurred would in any event have been expended in relation to the normal duties.

5. At all events, in order to be eligible for inclusion in the claim, Canada's costs must be reasonable in all the circumstances, proximately caused by the act and capable of being calculated with a reasonable degree of certainty. Costs that a reasonable person would consider were incurred unnecessarily cannot be considered as items in respect of which it would be proper to expect reimbursement from the USSR, eg. any testing costs which were incurred for purposes other than determining the degree of hazard presented. In addition, there must be a clear, unbroken connection between the COSMOS 954 satellite incident and the damage in respect of which the costs have been incurred. (See Parker, J. in the Lusitania Cases (U.S. v. Germany), Mixed Claims Commission.<sup>1</sup> Moreover, damages are not

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1. U.N. Rep., Vol. VII, p. 32 (1923)

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CONFIDENTIAL

recoverable for losses that are uncertain, speculative or contingent. (Rudloff Case (U.S. v. Venezuela), Venezuela Arbitrations of 1903).<sup>2</sup> However, Canada can reserve the right to claim in future for presently unidentified damage.

6. The search, recovery, removal testing and clean-up operations undertaken by Canada in respect of the COSMOS 954 satellite incident, however, are related to its duties under Article VI of the 1972 Liability Convention and to its duties under international and domestic law to mitigate the damage resulting from the unusual risks of danger from radioactive debris of the COSMOS 954 satellite. The costs incurred in these operations are, therefore, recoverable pursuant to the concept of restitutio in integrum. They are not merely costs of investigation incurred for the purpose of pursuing the claim; if they were such, they would be ineligible for inclusion in the claim; Trail Smelter Case (U.S. v. Canada).<sup>3</sup>

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2. U.N. Rep., Vol. IX, p. 244 (1903).

3. U.N. Rep., Vol. III, P. 1905 (1941),

A N N E X C

CONFIDENTIAL

COSMOS 954 SATELLITE - CLAIM AGAINST THE USSR

Disposition of United States Costs

1. Within minutes of the reentry of the COSMOS 954 satellite into Canadian territory on January 24, 1978, the United States offered Canada assistance in the search and recovery of debris from the satellite. Thereafter, in March 1978, United States officials indicated that the offer had not been contingent upon reimbursement of expenses incurred by the United States nor conditioned upon incorporation of these expenses in any claim which might be made by Canada against the USSR. The United States also indicated that it was within the discretion of Canada whether or not to include costs related to American assistance in Canada's claim. The matter was discussed in exploratory talks between Canadian and United States officials in May 1978.
2. If Canada is to include USA costs in its claim, it can only do so with legal justification if it has a legal obligation to pay such costs. International law requires that for an issue to be justiciable, there must be an actual controversy involving a conflict of legal interest between the parties.<sup>1</sup> But careful and sympathetic examination of the question had led to the conclusion that, as no legal obligation exists for Canada to reimburse the USA, there is no conflict of legal interest between Canada and the USSR with respect to USA costs and thus no basis for including those costs in the claim.
3. In judging whether there was a contract of any kind between Canada and the USA creating an obligation to pay, it is essential to examine the actual intention of the parties at the time the services were rendered. The intention at the relevant times in this case was that the USA was a volunteer which rendered its services gratuitously. In these circumstances, no contract, express or implied, existed and, accordingly, no claim for services rendered or work done can be made. In addition, the contractual concept of bargain involving an exchange of consideration is absent, for a moral obligation to pay USA costs would not be sufficient consideration to support an actual promise by Canada to pay such costs.

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1. "The function of the Court is to state the law, but it may pronounce judgment only in connection with concrete cases where there exists at the time of the adjudication an actual controversy involving a conflict of legal interest between the parties". Northern Cameroons Case, 1963 I.C.J. Reports, p. 15.

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4. The facts of the case do not give rise to the possibility of an implied contract or a quasi-contract. Moreover, although the concept of unjust enrichment, which presupposes that a benefit has been transferred from one party to another might, at first glance, seem to be applicable to the case, it is inapplicable as between the USA and Canada and, in any event, could not provide a legal basis for a claim against a third party, the USSR.

5. Further, one who voluntarily incurs expenses by performing work or services which are "necessary" to another cannot recover the costs in the absence of legal authority to incur them.

6. It cannot be successfully argued that Canada could claim against the USSR as the agent or mandatory of the USA since neither agency nor mandate existed and in any event an agent's or a mandatory's claim is no stronger than that of the principal or mandator. The USA suffered no "damage" and, accordingly, has no claim which Canada could present on its behalf.

7. In view of the foregoing, it is concluded that there is no legal basis on which Canada could include the USA costs in its claim against the USSR. It may be appropriate, however, to consider, as a matter of policy, the distribution to the USA, on an ex gratia basis, of a portion of any proceeds ultimately received in the settlement or other disposition of the claim.

Government  
of Canada

Gouvernement  
du Canada

MEMORANDUM

NOTE DE SERVICE

TO  
A

D/COMMR. (CR. OPS.)

FROM  
DE

D.P.P.

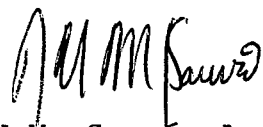
SUBJECT  
OBJET

Operation Morninglight - Cosmos 954 -  
Claims Against the U.S.S.R.

SECURITY - CLASSIFICATION - DE SÉCURITÉ
CONFIDENTIAL
OUR FILE - N/RÉFÉRENCE
HQ 485-35
YOUR FILE - V/RÉFÉRENCE
DATE
78-10-26

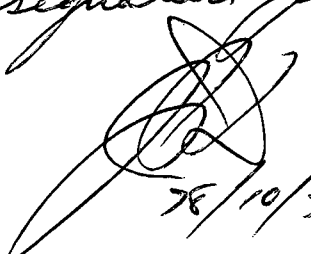
The Interdepartmental Committee on Cosmos 954 has prepared a paper for presentation to each of the Ministers whose department was represented on the committee. Inspector T.C. JENKIN of this Directorate represented both the Solicitor General's Department and the Force. Details of the last committee meeting, 78-09-29, as well as a list of the various committee members are outlined in the attached documents dated 78-10-17 and 78-10-25.

2. The Memorandum to Ministers, dated 78-10-18 together with a covering letter for the Commissioner's signature, is attached. The purpose of the memorandum is to place before the Minister recommendations respecting Canada's claim against the U.S.S.R. to seek his approval of the recommendations and the course of action proposed.

  
J.U.M. Sauvé, Asst. Commr.,  
Director,  
Protective Policing

Att.

Commr

*For signature please*  
  
78/10/31

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Department of External Affairs



Canada

Ministère des Affaires extérieures

CONFIDENTIAL

OTTAWA, K1A 0G2

October 25, 1978

Dear Inspector Jenkin,

Re: Cosmos 954 Claim Against the USSR

...  
...  
Attached is a summary of the main points discussed and decisions reached at the meeting of the Interdepartmental Committee on Cosmos 954 held on September 29, 1978 along with two copies of the final version of the Memorandum to Ministers and annexes discussed at the meeting. Revisions made following the meeting and incorporated in this version have been cleared through the ad hoc interdepartmental group of legal advisors. As the Schedule of Costs is still subject to revisions, you will note that the statement of qualification at the bottom of the Schedule remains. We should be grateful if you submit one copy of this material to your Minister for consideration and approval and advise us when approval has been given.

In addition, as Phase II of the search and recovery operations has now concluded, I would draw your attention to the need to prepare a Schedule of Costs covering the total and incremental costs expended during this phase. These costs, as with Phase I costs, should be reported to Mr. Kelen of the Department of Justice. *78.10.26*  
*// Referred to*  
*F. M. C.*  
*Sgt. Cooper J.*

The Prime Minister has requested a report on the status of the claim. Accordingly, we have also prepared a copy of the Memorandum to Ministers for submission to the Prime Minister by the Secretary of State for External Affairs.

Yours sincerely,

W.H. Montgomery  
Director  
Legal Advisory Division

Inspector T.C. Jenkin  
Officer in Charge  
Security Policy Section  
Security Systems Branch  
RCMP  
Vedic Building, Room 118  
720 Belfast Road  
OTTAWA K1A 0R2

*J 78.10.25.*

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FLA/G.R.SHEPPY/2-2486/sp/cl

EXTERNAL AFFAIRS



AFFAIRES EXTÉRIEURES

TO  
A FILE

FROM  
De FLA

REFERENCE  
Référence

SUBJECT  
Sujet Meeting of the Interdepartmental  
Committee on Cosmos 954

SECURITY  
Sécurité CONFIDENTIAL

DATE October 17, 1978

NUMBER  
Numéro FLA-1185

FILE	DOSSIER
OTTAWA	
MISSION	

ENCLOSURES  
Annexes

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DFE  
/Stevenson  
DIAND/Legal  
/Parks

On September 29, 1978, Mr. J.H. Taylor chaired a meeting of the Interdepartmental Committee on Cosmos 954 convened by the Under-Secretary of State for External Affairs. Present at the meeting were:

Mr. B.L. Strayer, Q.C., Assistant Deputy Minister,  
(Public Law), Department of Justice

Brig. Gen. J.P. Wolfe, Judge Advocate General,  
Department of National Defence

Dr. W.K. Gummer, Manager, Planning and Coordination Div.,  
Atomic Energy Control Board

Dr. E. Somers, Director General, Environmental Health  
Directorate, Health & Welfare Canada

Mr. H. Flynn, Planning Officer, Planning and Evaluation  
Sector, Energy, Mines and Resources

Mrs. Shirley Parks, Director, Legal Services,  
Indian Affairs and Northern Development

Inspector T.C. Jenkin, Officer in Charge, Security  
Policy Section, RCMP and Solicitor General

Mr. D.N. Stevenson, Chief Financial Officer of Fisheries  
and Marine Services, Fisheries and Environment

and their advisors as well as advisors from the Department  
-- of External Affairs. The attached agenda for the meeting  
was adopted.

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CONFIDENTIAL

2. The draft Memorandum to Ministers on the Cosmos 954 claim and attached schedule and legal studies were tabled and reviewed by the Committee. After discussion it was agreed that revisions or further inquiries as follows would be made:

Draft Memorandum for Ministers

- paragraph 7 - the words "recovery" and "removal" would be examined by experts in the Russian language to ensure that when translated into Russian they would properly convey the separate meanings of initial pick up and conveyance to a central location, and further conveyance to a storage area respectively.
- paragraph 8 - the second sentence would be revised as to style.
- paragraph 9 - the words "into Canadian territory" would be added to the first line of the paragraph after the words "COSMOS 954".
- paragraph 10 - a sentence would be added at the end of the paragraph indicating that the actual cost figures had not yet been finalized and would be reviewed once again by the Departments and Agencies concerned.
- paragraph 11 - a sentence would be added after the second sentence indicating that an additional consideration was the fact that Canada had not responded to the Soviet offer of assistance. In addition the word "dictate" in the penultimate sentence of the paragraph would be replaced by "suggest".
- paragraph 14 - the paragraph would be revised to include a reference to political considerations vis-à-vis the USSR regarding the claim and to comment on the timing aspect of the submission of the claim.

Schedule of Costs

- revised cost figures as submitted by DND and NHW would replace those shown in the Schedule.
- Departments and Agencies that had incurred costs would review their cost figures to ensure that they took into account tangible losses that could be established with certainty resulting from the diversion of resources from normal tasks to duties related to the Cosmos 954 satellite incident.

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Annex A

- paragraph 4 - the fifth sentence would be revised (taking into account the last sentence of paragraph 3 in Annex B) to delete "physical" and to note that all the satellite fragments found during Operation Morninglight, except for one, were radioactive.
- paragraph 5 - the last sentence would be deleted.

Annex B

- no revisions.

Annex C

- paragraph 1 - the words "hours after" in the first sentence would be replaced by "minutes of".

3. Concerning Agenda item 3 it was agreed that the Departments of External Affairs and Justice would be charged with the task of preparing the claim, with the cooperation of, and in consultation with, the other interested Departments and Agencies. The Committee expressed the hope that the claim, including the costs incurred during Phase 1 of the operations, would be ready for submission to the USSR by mid November.

4. With respect to the need to issue a press release at the time the claim was submitted to the USSR, the Committee concluded that the release and any public statement on the claim should be cautious and factual, and in particular not discuss the strengths and weaknesses of the claim, in order to avoid the possibility of compromising the claim. The two Departments responsible for preparing the claim should also initiate the drafting of the press release and the Department of External Affairs would consult with the Prime Minister's Office and the Privy Council concerning in whose name the release should be issued. The Committee also considered that the question of whether the claim should be referred to Cabinet would depend on the reaction of Ministers. Timing would become a critical factor if the Cabinet became involved.

5. As no other matters were raised, the Committee adjourned on the understanding that a clean draft of the material reviewed during the meeting, as revised, would be circulated to Committee members when transmitted to the Chairman for its submission to Ministers.

W.H. Montgomery,  
Director,  
Legal Advisory Division.

MEETING OF THE INTERDEPARTMENTAL COMMITTEE  
ON COSMOS 954

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FRIDAY, SEPTEMBER 29, 1978

A G E N D A

1. Tabling of the draft memorandum to Ministers, annex and legal studies.
2. Review and approval of the above material and agreement as to its transmission to Ministers.
3. Designation of External Affairs and Justice to prepare the claim.
4. Press release.
5. Other matters.



Government  
Canada

Gouvernement  
du Canada

MEMORANDUM

NOTE DE SERVICE

TO : OIC SECURITY SYSTEMS BRANCH

FROM : OIC SECURITY POLICY SECTION

SUBJECT : OPERATION MORNINGLIGHT

SECURITY - CLASSIFICATION - DE SÉCURITÉ
OUR FILE - N/RÉFÉRENCE HQ 485-35
YOUR FILE - V/RÉFÉRENCE
DATE 78-10-23

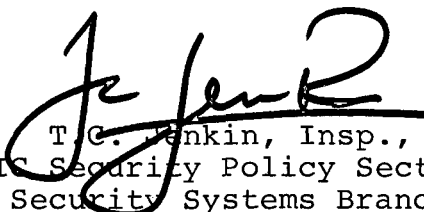
Security Systems Branch is in possession of a 16 mm. film regarding the re-entry of the Soviet Cosmos 954 satellite over the Northwest Territories in January 1978.

2. The film deals with the search and recovery program, detection methods and special handling techniques of recovered satellite debris. The film runs for approximately 12 minutes, and is not considered to be particularly useful as a training aid nor would it be of much assistance in the development of contingency plans. It emphasises the role of A.E.C.B./D.N.D.

3. We intend to forward the film to "G" Division Headquarters; however, before doing so, you may wish to ascertain whether the Director or A/DPP would care to view the film.

DPP

Do you or A/DPP wish to  
view this film prior to  
sending it to 'G' Div?  
J 78/10/24

  
T.G. Jenkin, Insp.,  
OIC Security Policy Section,  
Security Systems Branch

Not interested - have discussed  
with Insp. Jenkin.  
78.10.24.

A/DPP  
Do you have a look?  
I don't.  
AMT.

OIC SPS  
pre proceed  
J 78/10/30

AM/DPP  
78.10.24

000000



Atomic Energy  
Control Board

Commission de contrôle  
de l'énergie atomique

News  
Release

Communiqué

NEWS RELEASE 78-11

FOR IMMEDIATE RELEASE

October 18, 1978.

AISI-1 5-6'  
copy 78.11.02  
J.

PHASE II OF COSMOS SATELLITE SEARCH ENDS

OTTAWA - The Atomic Energy Control Board (AECB) announced today that Phase II of the search and recovery operation for debris from the Russian satellite, Cosmos 954, has ended. No further search and recovery program is anticipated.

Phase II, extending from mid-July to mid-October, was carried out by James F. MacLaren Ltd. and associated firms, under AECB direction. In addition to re-examination of areas searched in the first phase, winter operations in the Northwest Territories, the summer work extended into northern Saskatchewan and Alberta in an effort to locate and remove tiny radioactive particles that drifted south of the main satellite re-entry trajectory over Great Slave Lake.

The Phase I winter operation began on Jan. 24, 1978, following the early-morning plunge to earth of the satellite over the frozen northland, and continued to mid-April. The first phase was carried out entirely by federal agencies, assisted by the U.S. Department of Energy and affiliated experts, under the joint leadership of the Department of National Defence and the AECB. A prime role was played by the Geological Survey of Canada with its unique airborne detection expertise.

more...

- 2 -

A total of less than 100 kilograms of material were recovered. Included in the findings were a number of cylinders and short rods of beryllium, some of them appearing remarkably fresh and unaffected by the temperature of re-entry, but others being partially destroyed.

A number of flakes and chips, mostly of highly oxidized steel, presumably representing original structural members of the satellite, were recovered. There was also an incomplete assembly of control rods and tubes, about one metre long, and one section of stovepipe-shaped tubing roughly 50 cm by 25 cm.

The rod-and-tube assembly fell on the frozen surface of the Thelon River, northeast of Great Slave Lake, and was found in early February by a group of men wintering in the area. The stovepipe-shaped tube was spotted on the ice at the east end of Great Slave Lake and was the only piece of debris located that was not radioactive. This fragment is being loaned by the AECB to the National Museum of Science and Technology in Ottawa for display purposes.

In addition, approximately 3,000 tiny particles were detected and removed from towns and settlements, roads and railroads, camps and lodges. These particles, some so small they cannot be seen by eye, appear to be remnants of the fuel of the small nuclear reactor known to have been the source of power on board the satellite.

The radiation levels of recovered debris varied widely. The field from one small fragment was 200 roentgens per hour near contact when found, a level sufficient to kill a person in continued contact with it for a few hours. At the other end of the scale, the tiny particulate sources measured only a few thousandths or millionths of a roentgen per hour.

more...

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Most of the Phase II effort was expended on the recovery of the tiny particles. Although minute, their radioactivity has been strong enough that in view of the potential risk to people if they were accidentally inhaled or ingested, it was considered appropriate to locate and remove as many as possible.

The solubility of the particles was unknown at first, but as laboratory test work by the Department of National Health and Welfare later showed, they were in general relatively insoluble. With the radioactivity levels recorded, it was estimated that if a particle were ingested it would, in the normal time it would take to pass through the body, offer no greater radiation dose than would a medical X-ray examination of the gastric area.

For external hazards, it appeared that risks from the particles were low or non-existent in the normal course of events, but that there might be some risk to people if, for example, a particle were lodged in clothing, offering prolonged close contact.

In view of the internal and external risk considerations, it was agreed to search all frequented areas and to remove all particles whose presence was detected. A start was made in the towns in the Northwest Territories during winter, and then during the summer very detailed surveys of streets, yards, schools, playgrounds, water reservoirs, etc., were made in the expanded area embracing northern Saskatchewan and Alberta as well. Fishing camps, roads and railroad beds were also investigated.

Localities visited in the Northwest Territories included Hay River, Pine Point, Fort Resolution, Snowdrift, Reliance, and Fort Smith, in all of which a significant number of particles were found, and Fort Providence and Enterprise where nothing was detected.

more...

- 4 -

In Saskatchewan, Camsell Portage and Fond-du-Lac were searched without turning up anything. In Alberta, nothing was discovered at Embarras Portage, but a few minute particles were found and removed from Fort Chipewyan, Hay Camp and Fitzgerald.

It is recognized that particles fell far and wide over the area south of Great Slave Lake. Indeed, several uranium prospecting parties turned up particles during their detailed studies in the bush, and this was one of the reasons for extending the search area in the summer phase. Prospectors were advised that if any particles were found, they should be marked, authorities notified, and the location avoided.

Much of the country in the search area is underlain by rock with high natural radioactivity, a fact that increased the problems in the search for debris.

The particles of reactor core are steadily weakening in radioactivity as time passes. In September it was found that radiation levels were down to one-fifth of what they had been when the first measurements were made. This means that the particles left in tundra, muskeg and bush areas will simply decay to below natural background levels and no longer be detectable.

Furthermore, the particles are far enough apart that the chance of direct encounter is very slight. Particles that fell on lake or river ice will have long since settled to the bottom, becoming part of the natural sediment.

With respect to environmental concerns, the data from solubility studies will apply to wildlife as well as to humans. Calculations suggest that there is no need for concern, and in an effort to verify this, the federal Department of the Environment is sampling and analyzing fish from Great Slave Lake, and the Department of National Health and Welfare will be monitoring caribou meat from migrating herds.

more...

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- 5 -

National Health and Welfare has also been monitoring ground level air at Hay River and water supplies in townsites and has found no detectable contamination.

A final report on the clean-up operation is in preparation. This will provide details of the field work as well as the analytical studies carried out by Atomic Energy of Canada Ltd. at the Whiteshell Nuclear Research Establishment (WNRE) on a variety of debris to identify health and safety hazards.

With the exception of the non-radioactive stovepipe fragment sent to Ottawa, and some particles consumed in solubility testing in Ottawa, recovered debris is stored at WNRE's waste management facility at Pinawa, Man.

A claim is being prepared for presentation to the U.S.S.R. seeking some cost recovery for the massive clean-up operation. Pending action on the claim, all debris is considered as evidence. The AECSB is grateful to the governments of Saskatchewan, Alberta and the Northwest Territories for the cooperation and assistance provided during the search and recovery program.

- 30 -

Contact:

Hugh J. M. Spence  
Chief, Office of Public Information  
AECSB, Ottawa  
(613) 995-5894

G.S.785-47

1978-10-13

CONFIDENTIAL

Department of Justice,  
Wellington Street,  
Ottawa, Ontario.  
K1A 0H8

Att'n: Mr. Michael A. Kelen  
Civil Litigation Section

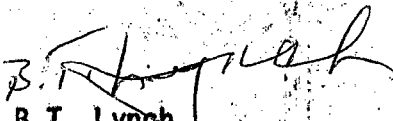
Dear Sir,

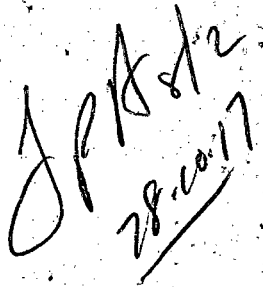
Re: Soviet Cosmos Satellite  
Claim Against U.S.S.R.

Receipt is acknowledged of your correspondence dated  
October 2, 1978.

In our correspondence dated August 30, 1978 we identified  
our total costs and we do not have any further costs caused by the  
diversion of our employees from their normal duties.

Yours truly,

  
B.T. Lynch,  
Officer in Charge,  
Financial Management  
Branch.

  
cc: Insp. T.C. Jenkins  
Security Policy Sec.

000000



Government  
of Canada

Document disclosed under the Access to Information Act -  
Document divulgué en vertu de la Loi sur l'accès à l'information

Government  
du Canada

**ACTION**  
**REQUEST**

**FICHE DE**  
**SERVICE**

TO - A

FILE NO. - DOSSIER N°

Insp. Jenkin

DATE

FROM - DE

Lucy Calabrese  
Sol - Sen's Office

☐ PLEASE CALL  
PRIÈRE D'APPELER

TEL NO. - N° DE TEL.

EXT. - POSTE

6-0220

☐ WANTS TO SEE YOU  
DÉSIRE VOUS VOIR  
☐ WILL CALL AGAIN  
DOIT RAPPELER

DATE

TIME - HEURE

CALL RECEIVED BY  
MESSAGE REÇU PAR

☐ ACTION  
DONNER SUITE

☐ COMMENTS  
COMMENTAIRES

☐ MAKE  
FAIRE COPIES

☐ APPROVAL  
APPROBATION

☐ DRAFT REPLY  
PROJET DE RÉPONSE

☐ SIGNATURE

☐ NOTE & RETURN  
NOTER ET RETOURNER

☐ NOTE & FORWARD  
NOTER ET FAIRE SUIVRE

☐ NOTE & FILE  
NOTER ET CLASSER

Re: Film on "Operation  
Morninglight". Do you  
want it sent here?

000000

TRANSIT SLIP



FICHE DE SERVICE

Date

TO  
À

FROM  
DE

Comments ☐ Commentaires

Perusal - No Action Required ☐ Pour information - aucune suite requise

Examination and Action ☐ Pour examen et suite

Prepare Reply ☐ Réponse à rédiger

Prepare Brief ☒ Exposé à préparer

See Sender ☐ Voir l'expéditeur

REMARKS  
COMMENTAIRES

Sgt Cooper, F.M.B.

I phoned Sgt Cooper. He was concerned about "incremental costs" -- i.e. a member called away from duty to guard & the costs of his replacement etc. -- I read him your memo to file 78-10-03 but he would like to talk to you anyway.

I told him to phone Tuesday 17<sup>th</sup>.  
O.K. with him. No hurry.

78.10.13

I talked to Cooper. I said I didn't feel we had any additional costs to be concerned with. He is J. A. H.



Government  
of Canada

Gouvernement  
du Canada

MEMORANDUM

NOTE DE SERVICE

TO  
A

Officer i/c Financial Management Branch

FROM  
DE

Officer i/c Legal Branch

SUBJECT  
OBJET

Soviet Cosmos Satellite  
Claim against the U.S.S.R.

SECURITY - CLASSIFICATION - DE SÉCURITÉ
OUR FILE - N/RÉFÉRENCE
YOUR FILE - V/RÉFÉRENCE GS-785-47
DATE 78-10-05

I am enclosing self-explanatory correspondence from Mr. Kelen dated 78-10-02.

As you are aware, Sgt. MacDonald of my staff attended the meeting of Interdepartmental Legal Advisers on 78-08-04 and at that time he confirmed our costs as being the amounts now set out in the Affidavit submitted to Mr. Kelen on August 30th last.

It would appear that Mr. Kelen still wishes confirmation of whether we have incurred other tangible quantifiable losses caused by the diversion of our employees from their normal tasks. Since Sgt. Cooper of your staff has been coordinating Force costs in this matter, I feel an appropriate reply should properly be made to Mr. Kelen from your office. In that Insp. Jenkins, Security Policy Section, attended the meeting on September 29th I am sure he will be in a position to assist you if further clarification is required.

F. Boivin, Supt.  
Officer in Charge,  
Legal Branch.

KJM:sm  
Encl.

c.c. - Insp. T.C. Jenkins, Security Policy Section ✓  
- Insp. D. Chiarot, Federal Policing Branch

OCT 5 1978

NO RECORD

OCT 13 1978

DIR.

000000



Department of Justice    Ministère  
of Justice                de la Justice

Ottawa, Canada  
K1A 0H8

October 2, 1978

209528

Re: Soviet Cosmos Satellite  
Claim against U.S.S.R.

Gentlemen:

The Interdepartmental Committee on September 29th, 1978 decided that the Claim and documentation in this matter will be submitted to the Soviet Union in November, 1978.

The position paper with respect to the "Costs eligible for inclusion in the claim" states in paragraph 4:

*"Incremental costs, however, may be considered to include tangible, quantifiable losses caused by the diversion of resources from normal tasks to duties related to the COSMOS 954 Satellite incident, even though the costs thereby incurred would in any event have been expended in relation to the normal duties."*

I enclose a copy of my letter to you dated July 21, 1978 where I request information of any tangible losses which could be claimed as incremental costs to your Department. At the Interdepartmental Committee Meeting on September 29th it was stressed that these tangible losses must be very clear and certain, and that the departments should not be attempting to recover the value of its' employees services for all projects which have been delayed.

Therefore would you please advise whether your Department has incurred such tangible, quantifiable losses caused by the diversion of its employees from their normal tasks.

Yours truly,

Encl.

Michael A. Kelen  
Civil Litigation Section

h.  
4/10/78



- 2 -

Mr. Raymond Roger  
Legal Adviser  
Atomic Energy  
Control Board  
7th Floor  
270 Albert Street  
Ottawa, Ontario  
K1P 5S9

Office of the Judge  
Advocate General  
National Defence  
Headquarters, Rm 201  
Ottawa, Ontario  
K1A 0K2

Attention: LCOL Brian Murphy,  
D Law/Claims

(Your File 1136-USSR D Law/C)

Mr. Brahm Levin  
Director  
Budget Preparation and  
Control Branch  
Department of Fisheries and  
Environment  
7th Floor, Fontaine Bldg.  
Hull, Quebec

Mr. G. Artichuk  
Administrative Officer  
Resource Geophysics &  
Geochemistry Division  
Energy, Mines and Resources  
Canada  
Science and Technology  
Geological Survey of Canada  
601 Booth Street, Room 568  
Ottawa, Ontario  
K1A 0E8

Mr. John F.D. MacIsaac  
Director  
Legal Services  
Atomic Energy Control Board  
270 Albert Street, 7th Floor  
Ottawa, Ontario  
K1P 5S9

Mr. Ron E. Williams  
Director  
Legal Services  
Department of Energy Mines  
and Resources  
Room 2015 "B", 580 Booth St.  
Ottawa, Ontario  
K1A 0E4

The Commissioner  
Royal Canadian Mounted Police  
Room 620, Pickering Bldg.  
250 Tremblay Road  
Ottawa, Ontario

Attention: Mr. B.T. Lynch  
Officer I/C  
Financial  
Management Br.

(Your File GS785-47)

Royal Canadian Mounted Police  
Headquarters  
1200 Alta Vista Drive, Rm G-207  
Ottawa, Ontario  
K1A 0R2

Attention: Supt. F. Boivin  
Officer I/C  
Legal Branch

Mr. Saul Tunis  
Legal Adviser  
Legal Services  
Department of National  
Health and Welfare, Rm 346  
343 Jeanne Mance Bldg.  
Tunney's Pasture  
Ottawa, Ontario  
K1A 0K9

(Your file 4240-8)

- 3 -

cc:

Mr. F.J.E. Jordan  
Director  
Constitutional, Administrative and  
International Law Section (Rm 625)  
Department of Justice

Dr. Gerald F. FitzGerald  
Constitutional, Administrative and  
International Law Section  
Department of Justice (Rm 624)

Mr. W.H. Montgomery  
Director  
Legal Advisory Division  
Department of External Affairs  
4th floor, Room 140  
125 Sussex Drive, Tower "A"  
Ottawa, Ontario  
K1A 0G2

Mr. Dan Dailey  
Department of Justice  
(Rm 616)

July 21, 1978

209528

Re: Soviet Cosmos Satellite  
Claim against U.S.S.R.

Gentlemen:

As you are aware we anticipate an argument that the only costs eligible to be included in our claim are those which would not have been incurred except for the Cosmos 954 Satellite incident, and such costs have been called "incremental costs". Therefore many of the total costs, such as salary expenditures, will not be eligible for inclusion in the claim.

However there is an argument that some of the non-incremental costs may be properly included as incremental costs when it can be demonstrated that Canada has incurred a loss as a result of the diversion of her resources or personnel from their normal assignments to Operation Morning Light.

You are requested to provide any information of any tangible losses which have resulted as a result of the diversion of your department's personnel or resources from normal activity to Operation Morning Light. Examples of such tangible losses would be the diversion of flying hours from a map-making project to Operation Morning Light or the contracting of another person from outside the department to do the normal function carried out by the person diverted to Operation Morning Light.

It is hoped that this information can be available for submission to the ministers during the week of August 14, 1978.

Yours truly,

M. A. KELEN

Michael A. Kelen  
Civil Litigation Section

- 2 -

Mr. Raymond Roger  
Legal Adviser  
Atomic Energy  
Control Board  
7th Floor  
270 Albert Street  
Ottawa, Ontario  
K1P 5S9

Office of the Judge  
Advocate General  
National Defence  
Headquarters, Rm 201  
Ottawa, Ontario  
K1A 0K2

Attention: LCOL Brian Murphy,  
D Law/Claims

(Your File 1136-USSR D Law/C)

Mr. Brahm Levin  
Director  
Budget Preparation and  
Control Branch  
Department of Fisheries and  
Environment  
7th Floor, Fontaine Bldg.  
Hull, Quebec

Mr. G. Artichuk  
Administrative Officer  
Resource Geophysics &  
Geochemistry Division  
Energy, Mines and Resources  
Canada  
Science and Technology  
Geological Survey of Canada  
601 Booth Street, Room 568  
Ottawa, Ontario  
K1A 0E8

Mr. Ron E. Williams  
Director  
Legal Services  
Department of Energy Mines  
and Resources  
Room 2015 "B", 580 Booth St.  
Ottawa, Ontario  
K1A 0E4

The Commissioner  
Royal Canadian Mounted Police  
Room 620, Pickering Bldg.  
250 Tremblay Road  
Ottawa, Ontario

Attention: Mr. B.T. Lynch  
Officer I/C  
Financial  
Management Br.

(Your File GS785-47)

Royal Canadian Mounted Police  
Headquarters  
1200 Alta Vista Drive, Rm G-207  
Ottawa, Ontario  
K1A 0R2

Attention: Supt. F. Boivin  
Officer I/C  
Legal Branch

Mr. Saul Tunis  
Legal Adviser  
Legal Services  
Department of National  
Health and Welfare, Rm 346  
343 Jeanne Mance Bldg.  
Tunney's Pasture  
Ottawa, Ontario  
K1A 0K9

(Your file 4240-8)

TO: Solicitor General's Office  
A: House of Commons  
K1A 0A7

DEPARTMENT OF NATIONAL DEFENCE  
MINISTÈRE DE LA DÉFENSE NATIONALE

DOCUMENT TRANSIT AND RECEIPT  
TRANSMISSION ET RÉCEPTION DE DOCUMENTS

FILE OR SERIAL NUMBER  
N° DE DOSSIER OU DE SÉRIE

#339

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WITH - AVEC WITHOUT - SANS  
DOCUMENT DOCUMENT

☐ TOP SECRET - TRÈS SECRET ☐  
☐ SECRET - SECRET ☐  
☐ CONFIDENTIAL - CONFIDENTIEL ☐  
☐ RESTRICTED - DIFFUSION RESTREINTE ☐  
☐ UNCLASSIFIED - NON CLASSIFIÉ ☐

QTY. - QUANTITÉ	COPY No(S) - COPIE(S) N°(S)	REFERENCE - RÉFÉRENCE	DESCRIPTION
One	Can	English	Operation Morning Light Film
<u>FOR OUR RECORD</u>			
RECEIPT REQUIRED - REÇU EXIGÉ YES - OUI <input type="checkbox"/> NO - NON <input type="checkbox"/>			FROM - DE - UNIT - UNITÉ (PRINT - EN MOULÉES) DIS - NDHQ DATE 4 Oct 78
SIGNATURE (RECEIVER - DESTINATAIRE)		DATE	NAME - NOM A.D. Stuebing RANK - GRADE - SIGNATURE (56481)

MEMO TO FILE

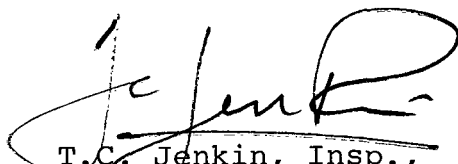
HQ-485-35

78-10-03

On 78 Sep 29 at 9:30 a.m. I represented the Solicitor General's Department and the R.C.M.P. at a meeting of the Inter-departmental Committee on COSMOS 954 re "Operation Morninglight". The purpose of the meeting was to table the draft Memorandum to Ministers and related costs which it is proposed to submit to the Russians for payment. The draft document was examined paragraph by paragraph. There were minor changes to a number of paragraphs but nothing of substance. There was considerable discussion as to the formula for calculating incremental costs and it was decided that a fixed formula would be decided upon and furnished to each Department so that a uniform costing could be made. This is necessary in that each cost figure will have to be defended with the Russians. External Affairs will get in touch with all Departments involved for a final costing of Phase I as it appears that some are considerably out of date or inaccurate.

2. The revisions will be made through the Committee of Legal Advisors and possibly another meeting will be held for acceptance of the final draft. It is hoped that a presentation will be made to the interested ministers during November. However, the question did arise that possibly the full Cabinet need be consulted. On this point, it was decided that guidance should be sought from the P.C.O.

3. I will contact Sgt. MacDonald of the Legal Branch and Sgt. Cooper of Financial Management Branch to inform them of the meeting and that they may possibly be involved again from the point of view of clarifying some of the words in the text and the financial expenditures which the Force expended on this operation.

  
T.C. Jenkin, Insp.,  
OIC Security Policy Section,  
Security Systems Branch

Op Res  
5

Cooper 31542 } contacted 78/10/03  
MacDonald 39910 }

→ GF 785-47 (file) PA 8/2

9:40  
9:40 AM

Asst. U/S Taylor in p. 6.

Agenda - Otag.

- document examined point by point
- claim to be made on exact figure of incremental costs.
- para 8 to be revised w/o changing intent.
- 10 - definition is to what constitutes incremental costs is to be worked on independently
- 11 turn "et gratia" caused some discussion (absence of a legal obligation)  
because Bureau's Office is not under direct U.S. >
- can't claim for U.S. expenses
- changed "dictate" to suggest.

- in

14 Phase II of Operation costing 1 1/2 M - simply being extra contents - don't believe ACOS is missing anything of consequence

000000

14. - include statement that  
as no reason or political  
grounds for making the  
claim & making it within  
a max 7 for months.

H & W changed costs - Remed  
is no longer lowest.

"recovery" - ~~and~~ meaning  
may be questionable.

costs could be included  
to compensate ~~at~~ in  
cases where personnel  
were diverted from  
projects to op. Manning light

Ex. APP. will get in touch with  
all Dpts for a final costing  
of phase I.



# Schedule of Costs.

- needs updating -

- ~~the~~ Should be common principles applied uniformly by all Ousts.

DND - Gen. Wolfe - said let's not make this too complicated

- keep simple - the main thrust is to get Pu. to make a payment, i.e. honour convention.

- See Annex B page 3 → page 5.

X FMB - should get copy of appl. corresp. i.e. affidavit, for ops file.

Figures must be reviewed to determine actual incurred costs.

## Annex 'A'

para - 4 - will be  
revised, i.e. physical  
damage - remove  
physical & try to define  
what damage means, i.e.  
interference with normal  
use of property.

## Annex B

- few revisions - para 3

## Annex C

revise within the hour - should  
be within "minutes"

accepted

5000 draft will be made  
→ revisions to be changed  
through legal advisors.

### Agenda 3

No ~~off~~ By: - use  
ad ~~the~~ structure of  
legal advisors

---

Formal presentation  
Nov 7P

---

no intention of cabinet  
involvement - rather ministers  
interested involvement. <sup>questioned</sup>

---

### Agenda 4

~~no~~ Press release  
when claim made -  
carefully worded.

will take  
PCs advice

---

MEETING OF THE INTERDEPARTMENTAL COMMITTEE  
ON COSMOS 954

---

FRIDAY, SEPTEMBER 29, 1978

A G E N D A

1. Tabling of the draft memorandum to Ministers, annex and legal studies.
2. Review and approval of the above material and agreement as to its transmission to Ministers.
3. Designation of External Affairs and Justice to prepare the claim.
4. Press release.
5. Other matters.

29573

Office of  
The Under Secretary of State  
for External Affairs



Cabinet du  
Sous-Secrétaire d'Etat  
aux Affaires extérieures

Canada

CONFIDENTIAL

OTTAWA, K1A 0G2

September 25, 1978

Dear Inspector Chiarot,

RE: COSMOS SATELLITE CLAIM

The chairman of the interdepartmental group of legal advisers preparing recommendations on the claim against the USSR in respect of the Cosmos 954 satellite incident last January has informed me that the group has completed its work on the preliminary legal aspects of the claim.

Accordingly, I am convening a meeting of the Interdepartmental Committee on Cosmos 954 to be held on Friday, September 29, 1978 at 9:30 a.m. in the Operations Centre Conference Room, 8th floor, Tower A, in the Pearson Building. The purpose of the meeting will be to review and approve the conclusions reached and the recommendations and course of action proposed by the group of legal advisers. As you have been designated by the Solicitor General to represent the Ministry and the RCMP on this Committee, I wish to invite you and your advisers to attend the September 29 meeting.

-- I attach copies of the material submitted by the group of legal advisers comprising

Inspector D. Chiarot  
Acting Officer in Charge  
Federal Policing Branch  
R.C.M.P.  
1200 Alta Vista Drive  
Room H-214  
OTTAWA K1A 0R2

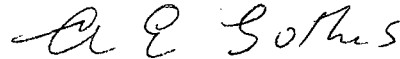
.../2

- 2 -

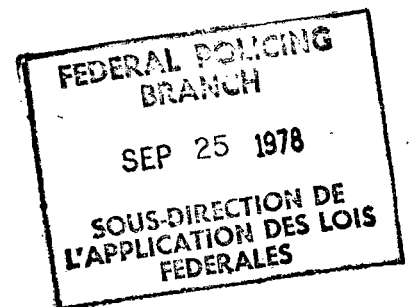
- a draft memorandum to Ministers;
- a draft schedule of costs; and
- legal studies in Annexes "A", "B" and "C".

For further information, please contact Mr. G.R. Sheppy (2-2486) in the Legal Advisory Division of this Department.

Yours sincerely,



A.E. Gotlieb  
Chairman



D R A F T

CONFIDENTIAL

MEMORANDUM TO: MINISTERS

FROM: CHAIRMAN, INTERDEPARTMENTAL COMMITTEE  
ON COSMOS 954

SUBJECT: COSMOS 954 - CLAIM AGAINST THE USSR

Introduction

The purpose of this memorandum is to place before you the recommendations of the Interdepartmental Committee having responsibility for the preparation of the claim against the USSR in connection with the COSMOS 954 incident. The recommendations are based on the conclusions of legal advisers of the departments concerned, and are directed to obtaining your approval of the course of action to be followed in submitting the claim to the Soviet Union.

2. Fragments from the nuclear-powered COSMOS 954 satellite entered Canada on January 24, 1978. The search for the radioactive debris of COSMOS 954 began almost immediately. During the operations, substantial assistance was rendered by USA authorities. The work of search, recovery, removal, testing and clean-up has given rise to costs incurred by the Atomic Energy Control Board and the Departments of National Defence, Energy, Mines and Resources, Health and Welfare and the Solicitor General. Costs incurred up to April 20, 1978, the date on which lead responsibility in the operations shifted from DND to AECB, and excluding USA costs, amount to approximately \$12,000,000 total of which some \$4,600,000 are incremental costs: i.e. costs that would not have been incurred had the COSMOS 954 incident not taken place. (USA costs are approximately \$3,000,000 and \$2,000,000 respectively.) Costs have also been incurred since April 20, 1978, and will continue to be incurred until the search for radioactive

.../2

- 2 -

CONFIDENTIAL

elements of COSMOS 954 is terminated. As a result of these operations, many radioactive fragments were recovered including two fragments which, if not recovered, could have caused serious injury to any person coming into contact with them at any time during the next several years. There is also the question of compensation for damage to persons and property that may be identified. To date, however, no such damage has been identified although the claim will reserve the right to claim for such damage in future.

3. Canada informed the USSR on February 28, 1978, that a claim for damages, including search and recovery costs, would be submitted as a result of the presence on Canadian territory of hazardous component parts of the satellite COSMOS 954.

#### Issues

4. There are three principal issues which Ministers are requested to address on the basis of information and advice set forth below:

(A) legal basis of Canada's claim; (B) costs eligible for inclusion in the claim and (C) disposition of USA costs.

#### (A) Legal basis of Canada's claim<sup>1</sup>

5. The Interdepartmental Group of Legal advisers considers that sufficient proof exists to establish that the satellite debris collected during the operations comes from the Soviet satellite COSMOS 954. On review of the relevant legal aspects, legal advisers consider that a claim by Canada for compensation should be based primarily on the absolute liability provision of the 1972 Convention on International Liability for Damage Caused by Space Objects, to which both Canada and the USSR are parties, supported as necessary by general principles of international law. This Convention is directed specifically to liability for damage, as defined therein, and the provision of a full and equitable measure of compensation for such damage.

.../3

1. See Annex A for a more detailed presentation.



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6. The advantages of the Convention are that the launching state is absolutely liable without proof of fault and that the Convention provides for: (a) determination of the amount of compensation, (b) negotiations with a view to settlement of the claim, and (c) if necessary, the establishment of a Claims Commission to consider the claim and render a final and recommendatory award. The major disadvantage of the Convention is that it may be argued that damage under the Convention, on a narrow interpretation, is restricted to physical damage, the relevant text of the Convention being as follows:

"... loss of life, personal injury or other impairment of health; or loss of or damage to property of States or persons..." (Article I(a))

7. For Canada's claim to succeed under the Convention, the term "damage" in Article I(a) must receive a broad interpretation to encompass the situation where the presence of hazardous radioactive COSMOS 954 debris on Canadian territory not only caused immediate damage by nuclear contamination rendering Canadian property unusable, but also created such a clear and immediate apprehension of damage to persons and property as to justify the incurring of substantial costs involved in the search, recovery, removal, testing and clean-up of the fragments of the satellite. This would be in accordance with the duty of Canada, like any other plaintiff, to mitigate the damages as defined. In fact, the results of the operations have shown that radioactive satellite fragments, some of them of a lethal character, were found on Canadian property and rendered that property unusable. The USSR, on the other hand, will probably contend that the mere presence of the fragments did not cause "damage" within the meaning of the Convention. It is by no means certain, therefore, that Canada's claim will prevail.

8. A second basis of Canada's claim is to be found in the general principles of international law concerning state responsibility.

.../4

- 4 -

CONFIDENTIAL *to be reviewed*

Here, however, the argument that, irrespective of the 1972 Convention, strict liability should apply to activities that are abnormally dangerous may be difficult to establish in the absence of any precedent.

9. A third basis is that the intrusion of COSMOS 954 constitutes a breach of Canadian sovereignty. In the circumstances of the claim, compensation for such a breach would likely be nominal. ✓

(B) Costs eligible for inclusion in the claim<sup>2</sup>

*incremental costs*  
10. The Interdepartmental Group of Legal Advisers has considered the question of proceeding on the basis of including total costs or only incremental costs. The Group has concluded that under both the Convention and general principles of international law, Canada is able to include in the claim only such costs of search, recovery, removal, testing and clean-up of COSMOS 954 debris as are consistent with the principle of restitutio in integrum, namely, costs which would not have been incurred except for the COSMOS 954 satellite incident. These costs are in general known as incremental costs and may be included provided they are reasonable, proximately caused by the incident and capable of being calculated with a reasonable degree of certainty.

(C) Disposition of USA costs<sup>3</sup>

11. The offer of assistance by the USA was not made contingent upon reimbursement, nor conditioned upon incorporation of the USA costs in any Canadian claim against the USSR. Thus, there is no legal obligation on Canada to reimburse the USA for costs incurred by the latter and therefore no legal basis exists for Canada to advance a claim on behalf of the USA. Nevertheless, policy considerations

.../5

2. See Schedule hereto for a summary of costs incurred and Annex B for a more detailed discussion of the basis for claiming costs.

3. See Annex C for a more detailed presentation.

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(such as preserving the appearance of equity and equality in our relations with the USA) may <sup>suggest</sup> dictate that, ultimately, a portion of any costs recovered from the USSR be distributed to the USA on an ex gratia basis. This would be for consideration when the outcome of the claim is known.

(inclusion of a legal obligation)

- Include statement why we are not including US expense in Canada claim - i.e. ~~turnover~~ <sup>turnover</sup> down Russian assistance, etc.

#### Conclusions

12. In the light of the foregoing and on the basis of the legal studies set forth in Annexes A, B and C hereto, the following conclusions may be drawn with respect to the claim:

- (A) There is a legal basis for a Canadian claim for compensation against the USSR, the validity of which, however, can be expected to be challenged on the interpretation to be given to the meaning of "damage" under the 1972 Convention and on the applicability of general principles of international law;
- (B) There are limitations on the costs of search, recovery, removal, testing and clean-up that may be included in the claim and the best legal view is that only incremental costs may be included;
- (C) There is no legal basis for including USA costs in the claim, although ultimately there may be policy grounds for distributing to the USA on an ex gratia basis, a portion of the proceeds of a successful claim.

#### Recommendations

13. It is recommended that Canada proceed with a claim against the Soviet Union:

.../6

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- (A) on the basis of the absolute liability provision of the 1972 Convention on International Liability for Damage Caused by Space Objects, supported as necessary by general principles of international law;
- (B) on the basis of the recovery of incremental costs; and
- (C) excluding USA costs.

Course of Action

14. The course of action to be followed would include:

- (A) the submission of a formal claim to the Soviet Union, covering insofar as costs are concerned Phase I of the operations. Canada has one year from January 24, 1978, the date of the incident, to submit the claim under the terms of the 1972 Convention. The claim would be submitted, however, as soon as preparations are completed and would be followed by a supplementary claim covering the incremental costs of Phase II of the operations. The claim would reserve the right to claim for damage which, given the nature of nuclear radiation, may become evident only at a later date.
- (B) negotiations with the Soviet Union on the substance of the claim for a period of up to one year, with the objective of reaching a settlement between Canada and the Soviet Union on the claim. The terms of the settlement would be submitted to Ministers for approval.

.../7

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(C) in the event of failure to achieve a bilateral settlement within one year, Canada would be in a position to request the establishment of a Claims Commission under the terms of the 1972 Convention. It is envisaged that Ministers would wish to review the Canadian position prior to the making of the request to establish a Claims Commission, and would wish to take decisions on matters such as the naming of the Canadian member, the selection of the neutral or third member, the nature of the Canadian submission to the Commission and the costs and other requirements for Canada of a lengthy international arbitration before a Claims Commission.

15. Do you agree with:

- (A) the recommendations on the COSMOS 954 claim; and
- (B) the course of action proposed?

A.E.G.  
Chairman,  
Interdepartmental Committee  
on COSMOS 954

# SCHEDULE

## COSTS BY DEPARTMENT

### 1. STATEMENT OF TOTAL AND INCREMENTAL COSTS (January 24 - April 20, 1978)

<u>Department or Agency</u>	<u>Total Costs</u>	<u>Incremental Costs</u>
DND		
a) Personnel Costs (military and civilian)	2,195,129.00	581,645.00
b) Aircraft Costs	7,375,917.00	2,216,253.00
c) Fees paid to non DND agencies	201,626.00	201,626.00
d) Material Costs	545,214.00	490,192.00
e) Transportation of personnel and Rental of Facilities	41,120.00	20,303.00
f) Miscellaneous Costs	33,770.00	33,770.00
g) Cost of DND Administration	1,039,278.00	354,379.00
Total:	<del>11,393,583.21</del> <del>11,432,054.00</del>	<del>3,867,245.70</del> <del>3,898,168.00</del>
HEALTH AND WELFARE	<i>amended by H &amp; W 78.09.29</i> 18,031.11 <del>22,384.00</del>	8,759.11 <del>12,372.00</del>
R.C.M.P.	<u>14,532.85</u>	<u>10,632.91</u>
E.M.R.	297,386.68	256,079.02
A.E.C.B.	380,246.97	380,246.97
TOTAL:	12,146,595.41	4,557,563.06

The above figures are subject to revision  
by the departments and agencies concerned

A N N E X A

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COSMOS 954 SATELLITE - CLAIM AGAINST THE USSR

Legal Basis of Canada's Claim: Nature of Damage

1. In this study there is an examination of the question whether such damage has been caused in Canada by COSMOS 954 as could give rise to a claim for compensation by Canada against the USSR. Here, it is seen that Canada's claim against the USSR for compensation in respect of the intrusion of the nuclear-powered COSMOS 954 satellite into Canada and its break-up in Canada in January 1978, rests primarily, but not exclusively, on the Convention on International Liability for Damage Caused by Space Objects, 1972 (the 1972 Liability Convention) and other instruments pertaining to outer space. Although the 1972 Liability Convention is directly relevant to the claim, it is not exhaustive of the applicable rules of international law. In this regard, it is observed that the mere entry of the satellite into Canada was a breach of Canadian sovereignty and, therefore, constituted an international wrong.
2. The obvious heads of damage that normally fall for consideration in a case like the present one are wrongful death or personal injury, or loss of or damage to property. However, due to the hazardous and deleterious nature of the nuclear material on board the satellite and the disintegration of the satellite over a wide area, substantial costs have been incurred in searching for, recovering, removing, testing and cleaning up debris from the satellite. For that reason, in the discussion below, emphasis is placed on ascertaining the legal basis for claiming such costs, whether under the 1972 Liability Convention or otherwise.
3. Article II of the 1972 Liability Convention provides that the launching state "shall be absolutely liable to pay compensation for damage caused by its space object on the surface of the earth...".

Article I(a) of the 1972 Liability Convention defines "damage" as meaning "loss of life, personal injury or other impairment of health; or loss of or damage to property of States or of persons, natural or juridical, or property of international intergovernmental organizations". As the definition of damage does not contain qualifications, it can be interpreted to include nuclear damage. This is confirmed by positions taken during negotiations that led to the preparation of the Convention. Therefore, a reading of Articles II and I(a) together indicates that the USSR, as the launching state, is absolutely liable to pay compensation to Canada for damage, including nuclear damage, caused by debris from the COSMOS 954 satellite.

4. The intrusion of a nuclear-powered satellite into Canada and its disintegration therein gave rise to a clear and immediate apprehension of the likelihood of damage, including nuclear damage, to persons and property. Hence, Canadian authorities were under a duty to take immediate steps for the search, recovery, removal, testing and clean-up of the fragments from the satellite. This duty was one that had to be carried out pursuant to domestic law for the protection of Canada. It was also necessary for Canada, under international law, to mitigate damages<sup>1</sup> which would be claimed against the owner of the satellite, namely, the USSR. As a result of the steps taken by Canada it has been found that discrete fragments of the satellite and pieces of the outer structure of the nuclear reactor on board the satellite, comprising twisted metal, pipe fragments, rods and the like, caused (physical) damage by rendering Canadian property unusable. In addition, there existed a clear and immediate apprehension of the likelihood of more serious kinds of damage due to the presence of a nuclear reactor on board the COSMOS 954 satellite. In particular, it has been confirmed, on the basis of radioactive contamination from a highly radioactive

*Meaning  
all frag.  
except  
one with  
no disintegration*

*Review //*

*... i.e. interpretation*

*Should be prepared to define .../3*

1. United States v. Nicaragua, 1900 For. Rel. 824, at 826-833; Portugo-German Arbitration (1928-30) U.N. Rep., Vol. II, 1011



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CONFIDENTIAL

*Revised*  
*just file*  
*use*  
piece of debris located on the McLeod Bay ice surface and from small, dust-like particles found on Canadian property, that the residue of the disintegrated nuclear reactor core, has entered the fragile ecology of northern Canada thereby causing radiation damage. In short, the steps taken by Canada disclosed the presence of radioactive satellite debris, some of which was of a lethal character, on Canadian property, which rendered that property unusable. There is also the risk of additional radiation damage in the future as the contamination spreads further into the human and natural environment. In this regard, it will be important to leave the door open to the possibility of making future claims in respect of damage to persons and property.

5. The above-mentioned operations were made more complicated because the USSR failed in its duty under international law by not giving, in timely fashion or with sufficient detail, information adequate to allay Canadian apprehensions of damage from the satellite which had been reported to contain, and did contain, material of a hazardous or deleterious nature. The costs of these operations were substantial whether considered in their totality or on an incremental basis.

6. Canada's claim against the USSR may also be founded on international instruments other than the 1972 Liability Convention and on general principles of international law. Briefly, pursuant to Article VII of the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies (1967), or the principles of international law, the USSR is liable for damage caused by COSMOS 954 or its component parts to Canada or Canada's natural or juridical persons. It can be argued that it is "a general principle of law recognized by civilized nations" (see Article 38 of the Statute of the International Court of Justice) that in the case of activities that

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CONFIDENTIAL

are abnormally dangerous, for example, outer space activities involving the use of nuclear-powered satellites, the operator of such an activity is strictly liable for damage caused thereby. In this regard it is noted that the USSR was, at all material times, pursuant to the second sentence of Article VIII of the 1967 Treaty, the owner of the COSMOS 954 Satellite or the component parts thereof which returned to Earth in Canada and as such cannot avoid liability with respect to damage caused by COSMOS 954 or its component parts by purporting to renounce ownership thereof.

7. It remains to consider the question of the violation of Canada's sovereignty by the intrusion of the COSMOS 954 satellite. The intrusion of the satellite constitutes an international wrong per se and it is not necessary, in order for Canada to claim compensation, to prove that the intrusion caused damage to persons or property. The act of intrusion itself (analogous to an act of trespass in domestic law) gives rise to compensation. A nominal amount may be claimed under this head.

A N N E X B

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COSMOS 954 SATELLITE - CLAIM AGAINST THE USSR

Costs eligible for inclusion in the Claim

1. This study focuses on the question of the extent to which Canada can include costs of search, recovery, removal, testing and clean-up in its claim against the USSR. This question must be determined in the light of the principle of restitutio in integrum which is reflected in Article XII of the 1972 Liability Convention and the statement of the Permanent Court of International Justice in the Chorzow Factory Case (1928)\*. Article XII of the Convention thus provides that the compensation

"shall be determined in accordance with international law and the principles of justice and equity, in order to provide such reparation in respect of the damage as will restore... the person... /or/ State... to the condition which would have existed if the damage had not occurred."

Similarly, if the USSR is liable to pay compensation to Canada, the measure of such compensation is established by the Chorzow Factory case in which the Permanent Court of International Justice reflected the principle of restitutio in integrum in the following statement:

"The essential principle contained in the actual notion of an illegal act - a principle which seems to be established by international practice and in particular by the decisions of international tribunals - is that reparation must, as far as possible, wipe out all the consequences of the illegal act and reestablish the situation which would, in all probability, have existed if that act had not been committed."

.../2

\* P.C.I.J., Ser. A, No. 17 (1928).

2. It has already been seen in Annex A that there is a legal argument for a Canadian claim for the costs of operations of search, recovery, removal, testing and clean-up. Here, it is recalled that Canada observed its duty in law, both domestic and international, to mitigate the damage which had been occasioned and which it apprehended could be caused by the nuclear-powered satellite, and incurred substantial costs in carrying out the related operations.

3. The USSR may argue that even if Article XII of the 1972 Liability Convention embodies the principle of restitutio in integrum, the costs of search, recovery, removal, testing and clean-up are not properly recoverable under Article XII. In this regard, the Canadian reply would be that it is within the letter and spirit of Article XII, as well as within the recognized principles of international law, that a claimant state may recover all costs that have been incurred by it due to the intrusion of the satellite. Because of the hazardous and deleterious material on board the satellite and the apprehension that there could have been wide-spread radiation damage, it was necessary for Canada to undertake the costly operations that were undertaken. Some highly radioactive material was found and the operations carried out obviated a need for placing a large area of Canada off limits or under restricted use, steps which could have given rise to unknown damages.

See  
p. 24  
Annex  
A 14

4. The best legal view is that, in the application of the principle of restitutio in integrum, costs for inclusion in the claim are limited to incremental costs, i.e., those which would not have been incurred except for the COSMOS 954 satellite incident. Hence, the claim cannot include costs which would have been incurred in any event regardless of the COSMOS 954 incident. Incremental costs, however, may be considered to include tangible, quantifiable losses caused by the diversion of resources from normal tasks to duties related to the COSMOS 954 satellite incident, even though the costs thereby incurred would in any event have been expended in relation to the normal duties.

5. At all events, in order to be eligible for inclusion in the claim, Canada's costs must be reasonable in all the circumstances, proximately caused by the act and capable of being calculated with a reasonable degree of certainty. Costs that a reasonable person would consider were incurred unnecessarily cannot be considered as items in respect of which it would be proper to expect reimbursement from the USSR, eg. any testing costs which were incurred for purposes other than determining the degree of hazard presented. In addition, there must be a clear, unbroken connection between the COSMOS 954 satellite incident and the damage in respect of which the costs have been incurred. (See Parker, J. in the Lusitania Cases (U.S. v. Germany), Mixed Claims Commission.<sup>1</sup> Moreover, damages are not recoverable for losses that are uncertain, speculative or contingent. (Rudloff Case (U.S. v. Venezuela), Venezuela Arbitrations of 1903).<sup>2</sup> However, Canada can reserve the right to claim in future for presently unidentified damage.

6. The search, recovery, removal, testing and clean-up operations undertaken by Canada in respect of the COSMOS 954 satellite incident, however, are related to its duties under Article VI of the 1972 Liability Convention and to its duties under international and domestic law to mitigate the damage resulting from the unusual risks of danger from radioactive debris of the COSMOS 954 satellite. The costs incurred in these operations are, therefore, recoverable pursuant to the concept of restitutio in integrum. They are not merely costs of investigation incurred for the purpose of pursuing the claim; if they were such, they would be ineligible for inclusion in the claim; Trail Smelter Case (U.S. v. Canada).<sup>3</sup>

1. U.N. Rep., Vol. VII, p. 32 (1923).

2. U.N. Rep., Vol. IX, p. 244 (1903).

3. U.N. Rep., Vol. III, p. 1905 (1941).

A N N E X C

CONFIDENTIAL

COSMOS 954 SATELLITE - CLAIM AGAINST THE USSR

Disposition of United States Costs

1. *as Appointes*  
Within ~~hours~~ after the reentry of the COSMOS 954 satellite into Canadian territory on January 24, 1978, the United States offered Canada assistance in the search and recovery of debris from the satellite. Thereafter, in March 1978, United States officials indicated that the offer had not been contingent upon reimbursement of expenses incurred by the United States nor conditioned upon incorporation of these expenses in any claim which might be made by Canada against the USSR. The United States also indicated that it was within the discretion of Canada whether or not to include costs related to American assistance in Canada's claim. The matter was discussed in exploratory talks between Canadian and United States officials in May 1978.
2. If Canada is to include USA costs in its claim, it can only do so with legal justification if it has a legal obligation to pay such costs. International law requires that for an issue to be justiciable, there must be an actual controversy involving a conflict of legal interest between the parties<sup>1</sup>. But careful and sympathetic examination of the question has led to the conclusion that, as no legal obligation exists for Canada to reimburse the USA, there is no conflict of legal interest between Canada and the USSR with respect to USA costs and thus no basis for including those costs in the claim.

.../2

1. "The function of the Court is to state the law, but it may pronounce judgment only in connection with concrete cases where there exists at the time of the adjudication an actual controversy involving a conflict of legal interest between the parties". Northern Cameroons Case, 1963 I.C.J. Reports, p. 15.

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3. In judging whether there was a contract of any kind between Canada and the USA creating an obligation to pay, it is essential to examine the actual intention of the parties at the time the services were rendered. The intention at the relevant times in this case was that the USA was a volunteer which rendered its services gratuitously. In these circumstances, no contract, express or implied, existed and, accordingly, no claim for services rendered or work done can be made. In addition, the contractual concept of bargain involving an exchange of consideration is absent, for a moral obligation to pay USA costs would not be sufficient consideration to support an actual promise by Canada to pay such costs.

4. The facts of the case do not give rise to the possibility of an implied contract or a quasi-contract. Moreover, although the concept of unjust enrichment, which presupposes that a benefit has been transferred from one party to another might, at first glance, seem to be applicable to the case, it is inapplicable as between the USA and Canada and, in any event, could not provide a legal basis for a claim against a third party, the USSR.

5. Further, one who voluntarily incurs expenses by performing work or services which are "necessary" to another cannot recover the costs in the absence of legal authority to incur them.

6. It cannot be successfully argued that Canada could claim against the USSR as the agent or mandatory of the USA since neither agency nor mandate existed and in any event an agent's or a mandatory's claim is no stronger than that of the principal or mandator. The USA suffered no "damage" and, accordingly, has no claim which Canada could present on its behalf.

.../3

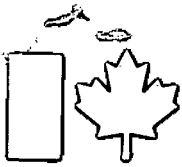
- 3 -

CONFIDENTIAL

7. In view of the foregoing, it is concluded that there is no legal basis on which Canada could include the USA costs in its claim against the USSR. It may be appropriate, however, to consider, as a matter of policy, the distribution to the USA, on an ex gratia basis, of a portion of any proceeds ultimately received in the settlement or other disposition of the claim.

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Atomic Energy  
Control Board

Commission de contrôle  
de l'énergie atomique

News  
Release

Communiqué

NEWS RELEASE 78-9

FOR IMMEDIATE RELEASE

September 25, 1978

NORTHERN SASKATCHEWAN GETS CLEAN BILL  
RE RADIOACTIVE DEBRIS FROM COSMOS 954

P D 28/9/78  
J 28/9/78  
78.09.27  
copy to G

OTTAWA - The Atomic Energy Control Board (AECB) announced today that it has completed a survey of the northwest section of the province of Saskatchewan for radioactive particles from the Soviet Cosmos 954 satellite which re-entered the earth's atmosphere on January 24. The lack of any finds in inhabited areas leads to the conclusion that there is no identifiable risk to the general public in the area due to contamination from the nuclear-powered spacecraft.

The AECB included the Lake Athabasca region in its summer search and recovery operations following reports this past spring that uranium prospectors had discovered a few isolated particles northwest of the lake in Saskatchewan, and in a few areas around the western end of the lake in Alberta.

The search area was extended east of the discoveries to see how far airborne particles might have drifted in that direction.

The AECB's program manager for the summer operations, James F. MacLaren Ltd., conducted thorough surveys of selected inhabited areas and communications routes as far east as Fond-du-Lac on the eastern tip of Lake Athabasca.

(more)

- 2 -

No particles were found at Fond-du-Lac, 90 kilometers to the east of Uranium City on the northern shore of the lake, nor were any detected in the community of Camself Portage, 40 kilometers west of Uranium City. Uranium City itself was not searched as it is already subject to a radiation clean-up program related to uranium mine waste rock and natural radioactive occurrences.

Prospectors may continue to encounter small and isolated particles in the regions south and west of Lake Athabasca, but the AECB reports that radiation levels have decreased significantly since the satellite plunged to earth eight months ago, such that the radioactivity from the particles is not much greater than normal background in an area known for uranium deposits. The radioactivity of any particles undetected in remote areas will continue to decrease to insignificant levels.

Search operations are continuing in northern Alberta and the Northwest Territories south of Great Slave Lake. The current activities, a follow-up to the intensive winter program conducted between January and April, are scheduled to end by mid-October.

- 30 -

Contact: Hugh J.M. Spence  
Chief, Office of Public Information  
AECB, Ottawa  
(613) 995-5894

DEPARTMENT OF NATIONAL DEFENCE  
INFORMATION SERVICES



MINISTÈRE DE LA DÉFENSE NATIONALE  
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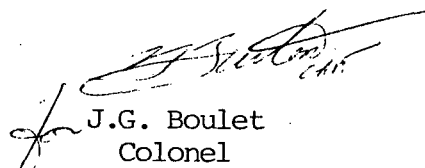
1350-3350-2 (DIS)

30 August 78

Distribution List

REVISED FACT SHEET - TELEPHONE AMENDMENT  
OPERATION MORNINGLIGHT ✓

1. Enclosed for your information is the latest copy of the Operation Morninglight fact sheet.
2. Please amend your telephone listing for Capt. Burton, Op Morninglight Ministerial Inquiry Coordination Centre to show 996-3450 vice 995-5996.

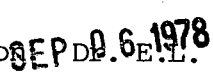
  
J.G. Boulet  
Colonel  
Director of Information Services

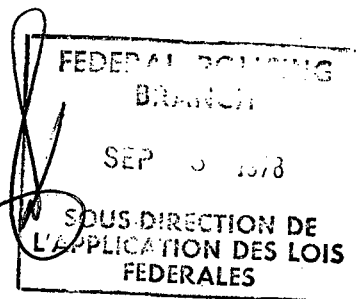
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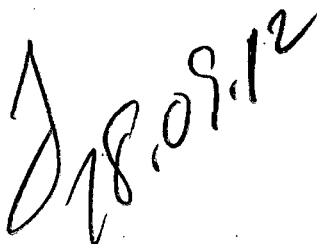
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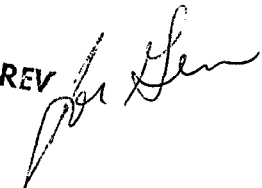
Internal

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PRESS SEC/MND  
D MIL  
DAOT 4  
DG Info  
DAOT 2  
DGIS

Attention:  Dr. E.L. Leger  
Mr. A.J. Cruikshank





OP REV  
5 

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External

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Mr. B. Stannard  
Mr. A.R. Stinton

O P E R A T I O N   M O R N I N G L I G H T

GENERAL INFORMATION FACT SHEET

REVISED 25 Aug 78

CONTRIBUTING DEPARTMENTS AND AGENCIES

Department of National Defence

Department of Energy, Mines and Resources

- Atomic Energy Control Board
- Geological Survey of Canada

Department of External Affairs

Ministry of the Solicitor General

- RCMP

DND INPUT FOR GENERAL INFORMATION FACT SHEET

REVISED 25 Aug 78

DEPARTMENT OF NATIONAL DEFENCE ACTIVITIES - OPERATION MORNINGLIGHT

Note: All timings, where included, are given in the time zone where they occurred with Ottawa local time in brackets. e.g. 1900 MST (2100).

Responsibilities

OPERATION MORNINGLIGHT is under Canadian control with the U.S. providing welcome and valuable assistance. The on-scene commander is Canadian Forces Colonel David Garland who is responsible for overall operations including activities of both the U.S. and Canadian personnel. Lieutenant Colonel Stu McGowan has been appointed commander at Wardens Grove.

24 Jan 78

Soviet Cosmos 954 entered the earth's atmosphere at 0353 PST (0653) north of the Queen Charlotte Islands on Canada's Pacific coast. Following approximately a three minute burn period during re-entry, pieces of the satellite impacted in the Northwest Territories between Great Slave Lake (62°30'N 114°W) and Baker Lake (64°30'N 96°W).

At 0910 EST (0910) the U.S. Department of Energy contacted the Canadian Department of National Defence to ask what assistance Canada might require from the U.S. Following discussions it was determined that USAF transport aircraft (C141s) would deliver U.S. gamma radiation detection equipment to Edmonton for installation in Canadian CCL30 Hercules aircraft. During the morning U.S. aircraft, on request, also conducted high altitude air sampling flights for gamma radiation.

The gamma radiation detection equipment arrived by USAF C141s at 1738 MST (1938). Four Canadian CCL30 Hercules aircraft were standing by for installation of the equipment. Meanwhile, the radiation monitoring section of the Edmonton nuclear accident support team arrived in Yellowknife, NWT.

25 Jan 78

By early morning the radiation monitoring equipment was installed in the Hercules and three aircraft started searching along the satellite track between Fort Reliance, near the northeast end of Great Slave Lake, and Baker Lake, some 500 miles to the northeast. At 1000 EST (1000), U.S. aircraft commenced a second air sampling mission over Michigan and Northern Ontario. Results of these tests also showed no abnormal radiation levels.

- 2 -

During the day the radiation monitoring section conducted ground radiation monitoring in both Yellowknife and Fort Reliance. Results of monitoring also showed no abnormal radiation levels.

26 and 27 Jan 78

The search continued during both days with no conclusive detection of satellite debris. On 26 Jan the radiation monitoring section was flown to Baker Lake where ground monitoring showed no increase in normal radiation levels. Also on 26 Jan, the Canadian radiation monitoring kit from the Department of Energy, Mines and Resources arrived in Edmonton and was installed in a Hercules aircraft. Up to 12 aircraft (11 Canadian) were involved in the search during the two days: three CC130 Hercules, three CC138 Twin Otters, three CC135 Twin Huey helicopters, one CH147 Chinook heavy lift helicopter and one U.S. Department of Energy Convair with infra red equipment. On 27 Jan the first radiation hot spot was detected using the Canadian radiation monitoring kit in the McLeod Bay area north of Fort Reliance in the northeast end of Great Slave Lake.

28 Jan 78

During the morning three radiation hot spots were detected by search aircraft on McLeod Bay. Two of the spots were later confirmed as satellite debris. By late afternoon, it was reported that two men of six in the Wardens Grove area, some 200 miles northeast of Fort Reliance, had discovered and touched an object on the nearby Thelon River ice. All six men from the Wardens Grove area were evacuated for radiation testing at Yellowknife and Edmonton. Tests indicated that none had picked up any radiation.

29 and 30 Jan 78

Two CP 107 Argus aircraft, one equipped for aerial photography, were added to the search. RCMP personnel were guarding the debris on McLeod Bay and Canadian Forces personnel were guarding the debris near Wardens Grove.

31 Jan 78

The search was now concentrated in the McLeod Bay and Fort Reliance areas with a total of 15 aircraft (14 Canadian) involved. The radiation monitoring kits, three from the U.S. and one from the Canadian Department of Energy, Mines and Resources, were all in use in the Argus and Hercules aircraft. The debris from McLeod Bay was taken to Yellowknife for analysis while scrapings from the debris on the Thelon River were taken to Edmonton in special containers for analysis by the Atomic Energy Control Board. Two RCMP constables joined the four Canadian Forces personnel at Wardens Grove.

1 Feb 78

By 1 Feb a number of radiation hot spots had been detected by air and then isolated by ground parties in the McLeod Bay area. Operations continued in removing the debris to Yellowknife and cleaning up each impact area to a radiation level of less than 100 micro rads/hour.

2 and 3 Feb 78

By 2 Feb it seemed apparent that most of the satellite debris had impacted in the McLeod Bay and Wardens Grove areas with a few impacts between the two and between Wardens Grove and Baker Lake. Only one piece of debris contained enough radioactivity to require very special handling techniques. For this piece a lead container was constructed by the University of Alberta and flown to the site.

Air searching continued along the debris track, with impact areas being marked by ground parties.

4 and 5 Feb 78

Over the weekend preparations were made to establish a base camp at Wardens Grove and air search activity increased. New impact areas were isolated in both the McLeod Bay and Wardens Grove areas. The highly radioactive piece of debris on the McLeod Bay ice was removed to Edmonton in the special lead container. Clean up activity of other impact areas continued.

By the end of the weekend, some 250 Canadian Forces personnel and about 115 U.S. personnel were directly involved in the operation. Aircraft had flown over 700 hours in the search to this point.

6 Feb 78

No searching or localizing activity was carried out but preparations continued with establishing a base camp near Wardens Grove so that recovery and clean-up activity could commence in that area. A Hercules positioned a bulldozer and other supplies in the area using the low altitude parachute extraction system. The bulldozer is being used to construct a landing strip.

7 Feb 78

By 7 Feb 78, 24 personnel were at the base camp (now referred to as Cosmos Lake) near Wardens Grove preparing the camp and airstrip. The U.S. Convair aircraft had returned to the U.S.A. and the Argus aircraft were also released from the search operation.



Activity will be concentrated in the Fort Reliance-McLeod Bay area to search for and recover any remaining debris with aircraft and personnel working out of Yellowknife. Following this stage, activity will be concentrated in the Wardens Grove area using the new Cosmos Lake camp as a base of operations.

8 and 9 Feb 78

Activity continued on both days in preparing the Cosmos Lake landing strip and establishing a main campsite, Camp Garland, a few hundred meters to the south of Cosmos Lake. Hercules aircraft positioned more fuel, supplies, and another bulldozer, again using the low altitude parachute extraction system.

A Hercules aircraft also located six new radiation hot spots in the area northeast of Fort Reliance.

10, 11, 12 Feb 78

On 10 Feb and during the weekend slightly less than 100 hours were flown, bringing the total aircraft flying hours to over 1100. Twelve aircraft, all Canadian, are still involved in the operation. At Cosmos Lake the landing strip is 3000 feet long and will soon be suitable for landings by Hercules aircraft. All accumulated radioactive material recovered to date is to be moved from Edmonton for further analysis at the Whiteshell Nuclear Research Establishment operated by Atomic Energy of Canada Limited (AECL) at Pinawa, Manitoba.

13, 14, 15, 16 Feb 78

During the week of 13 Feb search, location and recovery of satellite debris continued in the area around the northeast end of Great Slave Lake. On 14 Feb in Snowdrift, a small community on Great Slave Lake west of Fort Reliance, an AECB team, accompanied by the Snowdrift tribal band secretary, conducted a radiological survey which indicated no contamination of any people or buildings.

On 14 Feb the first fixed wing aircraft, a Twin Otter, landed on the 4900 foot ice strip at Cosmos Lake. A Buffalo aircraft made the second landing on 15 Feb. During the day (15 Feb) the 21 person joint Canadian - U.S. search and survey team was moved into Cosmos Lake by Chinook and Twin Huey helicopters and by Buffalo. A Hercules aircraft positioned an inflatable aircraft shelter, tents and snowmobiles onto Cosmos Lake again using the low altitude parachute extraction system.

- 5 -

The first Hercules aircraft, carrying 20,000 pounds of supplies, landed successfully on the Cosmos Lake landing strip on 16 Feb.

17, 18, 19, and 20 Feb 78

Twin Huey helicopter operations continued in the Snowdrift and Fort Reliance areas in an effort to clean up the dozens of minute particles.

By 20 Feb the personnel at Cosmos Lake totalled 54 (38 Canadian Forces, 1 Canadian civilian and 15 U.S. civilians). Fourteen aircraft are presently committed to the operation and the Canadian military flying time totalled approximately 1560 hours.

21, 22 Feb 78

On 21 Feb activity was concentrated in three areas: Snowdrift, Fort Reliance, and Cosmos Lake. Twin Huey helicopters, equipped with radiation detectors, flew missions south and east of Snowdrift to determine the extent of the small radioactive particles dispersed south of the satellite trajectory. These particles range from buckshot to pepper grain in size. Similar missions were flown on 22 Feb to the north and east of Fort Smith.

The debris found on the Thelon River ice by the men from Wardens Grove on 28 Jan was recovered and removed on 22 Feb by the team at Cosmos Lake.

23, 24 Feb 78

On 23 Feb the two Twin Huey helicopters were able to further define the area of low level contamination caused by the small particle dispersion at the western end of the search area. Approximate boundaries were established on the north, east, and south sides. The northern boundary follows the track of the satellite trajectory; the eastern boundary runs from Fort Reliance to a point approximately 30 miles north of Fort Smith; the southern boundary is an east-west line to an as yet undefined western boundary. The helicopters were attempting to establish the western boundary on 24 Feb.

No radioactive contamination has been found in Fort Smith. On 24 Feb the radiation monitoring section was conducting a survey in the area of Fort Resolution and nearby hunting camps. As of early 24 Feb Canadian military flying time totalled approximately 1830 hours.

28 Feb - 3 Mar 78

Atomic Energy Control Board (AECB), Health and Welfare Canada and Environment Canada authorities have reported their opinion that people living in the area where the satellite debris fell should not be concerned about changing their lifestyle or recreation activities.

- 6 -

Canadian Forces and AECB personnel were actively involved in the recovery of small, detectable particles in the townsites of Snowdrift, Pine Point and Fort Resolution. Because of their small size, these particles lost momentum quickly and under the influence of a northerly wind drifted over a wide area in a random fashion. They have been found as far west as near Hay River and as far south as Buffalo Lake. Measurements have shown the particles will not have added significantly to the natural background radiation. Nevertheless, to avoid possible health risks from close contamination and ingestion of particles in water melted from snow, it was agreed that clean-up activities would be conducted in the townsites.

Uranium and thorium-bearing rocks are found in this part of Canada, and the natural background radiation may locally be much higher than the figures given. However, in general, the natural radiation background on land in the area may be about 7 to 10 microR/hour, and the search instruments are sensitive enough to detect an increase of about 2 microR/hour at this level. The background over lakes is about half that on land.

Particles have not been distributed in a dense pattern but are scattered randomly and quite far apart. For example, in Snowdrift six particles were found roughly 200 feet apart. Thus clean-up in towns or wherever crowds of people are expected to congregate is perfectly feasible.

7 Mar 78

The search for particles continued in the areas of Lac La Prise and Artillery Lake, while the survey of Hay River was commenced. A new communications link between Edmonton and Cosmos Lake was established.

8 Mar 78

Clean-up in the area of Lac La Prise and Artillery Lake has been completed, and most of Hay River has been surveyed with all detected particles removed. A Hercules aircraft and two Twin Huey helicopters continued the search in the area between Yellowknife and Lac La Prise, while an Argus aircraft from Summerside completed coverage of approximately 750 miles around Cosmos Lake to provide pictures on a scale of 1:20,000 for the production of mosaics.

9, 10, 11, 12, and 13 Mar 78

Twin Huey helicopter search operations continued in the Hanbury Lake area and were commenced in the area east of Yellowknife. Coverage of the area east of Cosmos Lake is now complete.

- 7 -

On 10 Mar 1600 MST (1800) the RCMP at Cape Dorset notified Edmonton that a 25 year old Inuit had discovered a hole in the ice of an unnamed lake 25 miles north west of Cape Dorset. The RCMP have also advised local residents to avoid the area.

On 11 Mar a combined team of Canadian Forces, AECB and U.S. personnel were flown by Hercules to Frobrisher Bay. An RCMP Twin Otter flew them to Cape Dorset and they then were taken out to the lake by skidoo. On arrival they discovered a crater approximately 18 feet in diameter. Chunks of ice had been thrown as far as 75 feet from the hole, with the largest chunk being 18' X 10' X 2'. The ice thickness is approximately 5 feet and the lake is estimated to be 15 feet deep. No radiation was detected.

On 13 Mar a Twin Huey was dissassembled for shipment to Frobisher Bay by Hercules. The Twin Huey is to be placed on standby at Cape Dorset for use by the scientific staff.

Maritime Command has been tasked to provide an underwater camera and operators for use at Cape Dorset. They will be despatched as soon as they can be employed.

#### 14 Mar 78

Aerial survey of the Hanbury Lake area has been completed, and both aerial survey and recovery operations are continuing in the area south of Yellowknife. In an attempt to determine particle distribution in cleared areas around Great Slave Lake, ten sites have been selected in which 20 samples will be taken from each site. The samples will then be analysed to determine the particle distribution.

A check of the water reservoirs and intake filters has been completed at Pine Point and no contamination was found.

#### 15 Mar 78

The Twin Huey helicopter arrived in Cape Dorset and a short reconnaissance flight was conducted over the crater site.

#### 16 Mar 78

The underwater TV camera and a three man crew arrived in Cape Dorset. They plan to establish a tented camp at the crater site and after determining the physical characteristics of the ice they will prepare the surface for the introduction of underwater detection equipment. As of early 16 Mar the Canadian military flying time totalled approximately 3,402 hours.

- 8 -

17 Mar 78

Four holes were augered through the 6'-6'4" ice at the Cape Dorset site with each hole taking almost one hour to dig. Water depths under the ice varies from 11 to 17 feet.

20 Mar 78

Two small particles have been detected and removed from the Lac La Prise-Fort Reliance Area, while three detections near Hamburg Lake were found to be caused by geological phenomena. Several minute particles have been recovered from Buffalo Lake area and a new particle survey area has been established on Radcliffe Island.

Metal Detection equipment at Cape Dorset site have found no evidence of metal under the ice. Dr. Frederking of the National Research Council, an ice formation specialist arrived to check into the site.

22 Mar 78

Investigations and analysis of lake ice scatter area is complete, Dr. Frederking concludes that the area is not an impact hole but result of a natural phenomena caused by water seepage through rock from another lake above the lake in question. This seepage forms an ice boil which fractures under conditions of extreme water and thermal stress, scattering ice pieces. Accordingly Morninglight operations at Cape Dorset have been discontinued. A follow-up visit to the site is recommended when ice is out.

Members of the U.S. Department of Energy who have been assisting in the search for Cosmos 954 since January are now phasing out the operation and all except one Scientist and an energy advisor, who will remain in Edmonton for an indefinite period, have departed.

28 Mar 78

MRS coverage by C130 Hercules aircraft is on going in the areas between Lac La Prise and Wardens Grove, as well as in the area south of Yellowknife. Helicopter flights are being used to:

- a. localize radioactive debris detected by the C130,

.../9

- 9 -

- b. search a 3 mile square centered on each community  
in crash area, and
- c. to search all known transportation routes.

Town clean-ups have been completed in Hay River, Pine Point, Fort Resolution and Snowdrift with all detected particles removed.

A ground survey has been completed of four fishing lodges on the south east side of Great Slave Lake and five lodges north east of Yellowknife. No contamination was found.

30 Mar 78

Due to the lessening requirement for an active search portion of Op. Morninglight, operations at Cosmos Lake have ceased and no personnel remain.

3 Apr 78

All towns in the satellite crash area have been searched, and where necessary cleared. Forty fishing lodges have been surveyed and cleared, and most of the transportation routes have been surveyed with no activity detected.

A detector equipped CH135 helicopter is conducting an extensive grid search over a 100 metre square, in selected representative areas in order to provide a data base from which to calculate a statistical assessment of the environment impact of active fallout within the search area, on both land and water.

4 Apr 78

MRS coverage is complete in all areas except the Lac La Prise-Hamburg Lake area where operations continue.

10 Apr 78

The last planned MRS flight has been completed. The CH135 helicopter grid search continues and coverage of the Whooping crane nesting areas is underway. The total flying time involved with Op Morninglight for all aircraft is 4635 hours.

05 May 78

To date Canadian Forces have conducted aerial surveillance flights over approximately 50,000 square miles into which debris from the re-entry of the Soviet satellite Cosmos 954 may have fallen.

- 10 -

Aerial surveillance flights by the Canadian Forces although reduced are continuing as required by other Federal Departments and Agencies in their respective monitoring programs throughout the spring and summer of 1978. As has been the practice thus far in this operation the Departments of National Defence, National Health and Welfare, Energy Mines and Resources, Fisheries and Environment and Indian and Northern Affairs will continue to support the Atomic Energy Control Board of Canada which, by statute, is the Federal regulatory authority responsible for protecting the health, safety and security of Canadians with regard to all aspects of nuclear energy.

PREPARED BY

Capt S.B. Burton

OPERATION MORNINGLIGHT  
Ministerial Inquiry Centre  
996-3450

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July, 1978

INFORMATION FACT SHEET

ATOMIC ENERGY CONTROL BOARD ACTIVITIES - COSMOS 954 RECOVERY

The Atomic Energy Control Board (AECB) is the federal regulatory authority responsible for protecting the health, safety and security of Canadians with regard to all aspects of nuclear energy. As such, in the Cosmos 954 nuclear-powered satellite incident, the AECB is the prime technical adviser concerned with the safe recovery of any radioactive debris, and its custody, transportation and laboratory analysis. The Board is also technical adviser to the External Affairs Department with respect to its negotiations on this matter with the Soviet Union at the United Nations.

Working in close cooperation with the Department of National Defence, the Geological Survey of Canada, Atomic Energy of Canada Limited, and technical experts volunteered by the United States government, small teams of AECB scientists were involved in the identification and physical recovery of pieces of the satellite discovered on the ground through aerial surveys during the first phase of the search, January to mid-April.

While the spring break-up was in progress, there was a pause in operations. In this period, an AECB health physicist and medical authorities from Health and Welfare Canada visited a number of the communities in the Northwest Territories within the search area. Public meetings were held to explain what had been found as well as what could be expected in the near future, and to answer questions from people in the audience.

In mid-June, the AECB announced that a second phase search and recovery operation would be undertaken during the summer months, with the Board as lead agency.

.../2



- 2 -

The purpose of the Phase Two search is to further establish, under conditions free of snow and ice, that the extensive program conducted during the winter has adequately cleaned up radioactive material in settled and frequented places. The on-going search was planned in cooperation with the Northwest Territories government and with appropriate health, environment and indian affairs agencies.

Satellite debris found and recovered so far is of two kinds: distinct, visible pieces, and very small particles which can only be discovered due to the radiation they emit.

The AECB is confident that all large fragments of the satellite were recovered, at least those that had any significant radioactivity associated with them.

Although the level of radiation from small particles found south and east of Great Slave Lake is not generally dangerous, and although that level has significantly diminished through radioactive decay in the time since the satellite came down, further work is required to ensure the minimum risk to people from radiation from Cosmos 954 debris.

In the winter search, it was found that the bulk of the material fell within the Northwest Territories. However, intensive prospecting for uranium in northern Saskatchewan and Alberta this spring turned up a few tiny particles and it became apparent that some investigations should be made south of the 60th parallel.

A contract for up to \$847,000 was awarded to the engineering consulting firm of James F. MacLaren Ltd. to conduct the second phase of the Cosmos 954 satellite search and recovery operation. A liaison office has been established by the AECB in Hay River, N. W. T., for the duration of the second phase work.

.../3

- 3 -

Acting as program manager, James F. MacLaren Ltd. will conduct aerial and ground searches in inhabited areas, other areas likely to be frequented by people, and on transportation routes. The search area will include northern Alberta and Saskatchewan as well as the primary re-entry track and impact area in the Northwest Territories.

All samples recovered are sent to the Whiteshell Nuclear Research Establishment (WNRE) at Pinawa, Manitoba, a laboratory operated by Atomic Energy of Canada Limited. WNRE is particularly well suited to conduct the types of tests needed on the samples, and also operates waste management and storage facilities in which material from the satellite can be held pending a decision on its ultimate disposition.

At Whiteshell, the samples undergo metallurgical, chemical, radiological and other tests, with the results forwarded to the AECB in Ottawa for further interpretation and transmittal to other agencies as required.

Feedback from the laboratory tests assists field operations in further detection work.

FOR FURTHER INFORMATION:

Hugh J. M. Spence  
Chief, Office of Public Information  
OTTAWA, (613) 995-5894

EMR INPUT FOR GENERAL INFORMATION FACT SHEET

ENERGY, MINES AND RESOURCES ACTIVITIES - OPERATION MORNINGLIGHT

1. INTRODUCTION

The major contribution of the Department of Energy, Mines and Resources (EMR) to Operation Morninglight was in providing equipment and scientific staff to conduct C-130 and CH-135 gamma-ray spectrometry search operations. In addition experienced staff and equipment were provided for ice drilling and underwater probing at the site of the Warden's Grove crater, and in planning and executing an experiment in an attempt to determine whether a seismic signal recorded at EMR's Yellowknife seismic array at the time of the satellite impact could have been caused by a large piece of debris impacting on the frozen surface of Great Slave Lake southeast of Yellowknife. All of these activities were carried out by the Geological Survey of Canada (GSC), except the seismic experiment which also involved the Earth Physics Branch of EMR.

The GSC underwater probing attempt at Warden's Grove was curtailed owing to difficulties with the equipment in the cold weather. The seismic simulation in which barrels of ice were dropped on the surface of Great Slave Lake from a helicopter produced no detectable signals at the Yellowknife array, indicating that the signal recorded on January 24 was not generated by a 200 lb. or smaller object hitting the ice at terminal velocity.

2. BACKGROUND

The GSC has been conducting airborne gamma-ray spectrometry surveys since 1969 when the GSC and Atomic Energy of Canada Ltd. jointly developed a high sensitivity spectrometer system for applications to geologic mapping and mineral exploration. From 1970 to 1977, more than 500,000 km<sup>2</sup> of the Precambrian Shield has been surveyed by the GSC, using the 1969 spectrometer, flown in a Short Bros. and Harland Skyvan aircraft.

In 1977, development of a new computer-based spectrometer was completed by the GSC and test flown just before the end of the field operations season, in October, 1977. Although no preparations for Operation Morninglight had been made prior to January 25, 1978, the new spectrometer and GSC personnel experienced in conducting airborne spectrometer surveys were mobilized to Edmonton on the evening of January 25; the equipment was

- 2 -

installed in a C-130 aircraft and commenced operating in the search for satellite debris that night.

During the second flight, evidence was obtained of a man-made radiation source on the frozen surface of the East Arm of Great Slave Lake. A subsequent study of the accumulated spectra corresponding to the anomaly showed unmistakable evidence of the fission product lanthanum ( $^{140}\text{La}$ ). From January 26 to February 1, the GSC spectrometer was flown on gross search pattern between Great Slave Lake and Hudson Bay. On February 3 the spectrometer was installed in the same C-130 that carried the EG&G MRS survey spectrometer, in order to fly calibration lines over a source on Great Slave Lake. Since the GSC system was not equipped with MRS navigation, it was left on board the aircraft carrying the EG&G system, and flew detailed surveys at 1500 foot line spacing from February 3 to 14. Between February 24-28 tests of the Canadian MRS system, interfaced to GSC spectrometer were conducted, and from March 1 to April 8, MRS flights were done with the GSC spectrometer.

As a result of GSC specifications prepared in 1975 for federal-provincial uranium reconnaissance exploration contracts, a number of Canadian geophysical companies now manufacture airborne spectrometer systems that meet the high standards set by GSC for uranium exploration applications. Consequently, when plans to convert the helicopter spectrometer operations from U.S. to Canadian were being formulated, it appeared that the requirements could readily be filled by a Canadian contractor. Two helicopter spectrometer systems and operators were provided by McPhar Instruments Ltd. (on March 3, and March 10) and one Scintrex system arrived in Edmonton on March 24. All three systems were used to locate and mark radioactive pieces of satellite, until the end of Operation Morninglight on April 15, 1978. In addition, one of the McPhar systems was flown in a systematic pattern over Great Slave Lake in order to estimate the total fallout from the satellite reactor core on the ice covering the lake.

DEA INPUT FOR GENERAL INFORMATION FACT SHEET

DEPARTMENT OF EXTERNAL AFFAIRS ACTIVITIES - OPERATION MORNINGLIGHT

Canada/USSR Contacts -- Soviet Cosmos 954

The Canadian Government has been in contact with the Soviet authorities on this matter since January 24. In response to Canadian requests, the Soviets have, after some delays, provided some information on the technical characteristics of the satellite, which has assisted us in the ongoing search for radioactive debris.

In accordance with Article V of the 1968 Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space, Canada officially notified the Secretary-General of the United Nations and the Government of the Soviet Union on February 8, 1978, of the discovery on Canadian territory of component parts of Cosmos 954. In a statement at the UN on February 14, a Soviet representative acknowledged that the Canadian description of the facts surrounding the re-entry of the satellite was correct and that the USSR would fulfill its obligations under international law to reimburse Canada for any damage. It is expected that an interim claim will be submitted to the Soviet Union this autumn.

Follow-up Action in the United Nations

On February 13, 1978, Canada raised the question of the international implications of the Cosmos incident in the Scientific and Technical Sub-Committee of the UN Outer Space Committee. In his statement, the Canadian Ambassador to the UN described as the overall objective the development of a régime for the use of nuclear energy sources in outer space which would ensure the highest standards of safety for mankind and protection of the environment. In this connection, Canada and other concerned states recommended the establishment of a working group of experts which would make recommendations concerning the safety aspects of the use of nuclear power in space. At a subsequent meeting of the Legal Sub-Committee, Canada recommended a review of existing legal instruments and the development of additional legal measures to govern the use of this technology. Although it did not prove possible to achieve agreement at the Sub-Committee stage, the parent Outer Space Committee, which met in New York in late June, approved with Soviet

- 2 -

concurrence the establishment of the working group of experts, who will meet in February 1979, on the basis of a comprehensive mandate as originally proposed by Canada. Canada also looks forward to continued discussion of this question at the UN General Assembly this fall.

SOLICITOR GENERAL INPUT FOR GENERAL INFORMATION FACT SHEET

ACTIVITIES OF THE MINISTRY OF THE SOLICITOR GENERAL - OPERATION MORNINGLIGHT

Responsibilities

The search for radioactive debris from the Soviet Cosmos 954 satellite which impacted between Great Slave and Baker lakes, Northwest Territories, is under the overall control of the Department of National Defence. The responsibilities of the Ministry of the Solicitor General to date have been:

- a) to safeguard the press and public from radioactive contamination by providing an RCMP presence at each accessible impact site, and
- b) area patrols to inform isolated personnel to stay clear of affected areas.

Constant liaison is maintained with Canadian Forces personnel so that RCMP may attend when new finds are made.

General Comment

On-scene RCMP report there has been very little public reaction over the satellite incident in the general area affected except for some initial concern at Snowdrift, a settlement near the Fort Reliance debris site. These concerns were allayed by a special visit by military officials and radiation experts who advised there was no danger. RCMP present at debris sites have not as yet encountered unauthorized persons during their tours of duty.

Future Involvements

It is anticipated that an RCMP presence will continue to be required at each site discovered until cleanup operations are completed. Projections of resources expenditures are not possible at this time as resources required will depend on such factors as number of sites discovered and accessibility to the public.

It is also expected that native peoples and other residents in the area affected will turn to the RCMP for reassurance whenever they discover isolated bits of metal or other debris or even suspect fish or animals. The Atomic Energy Control Board has offered to provide the necessary detection equipment for RCMP Detachments at Baker's Lake and Snowdrift.



Atomic Energy  
Control Board

Commission de contrôle  
de l'énergie atomique

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NEWS RELEASE 78-3

85-34(1-1-1)  
HQ-485-26 ?  
FOR IMMEDIATE RELEASE  
June 19, 1978

COSMOS SATELLITE: PHASE TWO SEARCH PLANNED

OTTAWA --- The Atomic Energy Control Board (AECB) announced today that plans are being finalized for an on-going search for radioactive fragments resulting from the Jan. 24, 1978, re-entry of the Soviet Cosmos 954 satellite over the Northwest Territories. This work, to be conducted by a program manager under AECB direction, had been planned as an integral part of the overall search and recovery program from its early stages.

The purpose of the Phase Two search is to further establish, under conditions free of snow and ice, that the extensive program conducted during the winter has adequately cleaned up radioactive material in settled and frequented places. The on-going search is being planned in cooperation with the Northwest Territories government and with appropriate health, environment and indian affairs agencies.

Although the level of radiation from small particles found south and east of Great Slave Lake is not generally dangerous, and although that level has significantly diminished through radioactive decay in the time since the satellite came down, further work is required to ensure the minimum risk to people from radiation from Cosmos 954 debris.

In the winter search, it was found that the bulk of the material fell within the Northwest Territories. However, intensive prospecting for uranium in northern Saskatchewan this spring has turned up a few tiny particles and it has become apparent that some investigations should now be made south of the 60th parallel. There has been no report from prospectors regarding particles found in northern Alberta, but the AECB is of the opinion that investigation is justified in that area as well.

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- 2 -

The surveys being contracted by the AECB in the Northwest Territories will be extended to the south, and therefore the Board has been in contact with government agencies in both Alberta and Saskatchewan for preliminary discussions of the matter.

- 30 -

Contact:

Hugh Spence,  
Chief, Office of Public Information  
AECB, Ottawa. (613) 995-5894

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14 August 1978

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in the August 1978 issue of Reader's Digest.

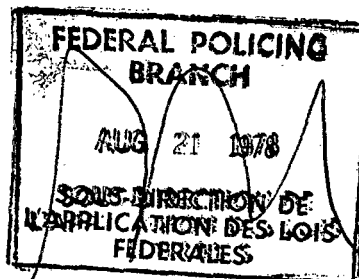
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J.G. Boulet  
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Director of Information Services

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See page 2



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Attention: Inspector Chiarot

Planning and Evaluation Branch  
Room B1925  
580 Booth Street  
Ottawa, Ontario  
K1A 0E4

Attention: Mr. H. Flynn

Emergency Planning Canada  
Lester B. Pearson Building  
125 Sussex Drive  
Ottawa, Ontario  
K1A 0G2

Attention: Mr. B. Stannard

Geological Survey of Canada  
601 Booth Street  
Ottawa, Ontario  
K1A 0E8

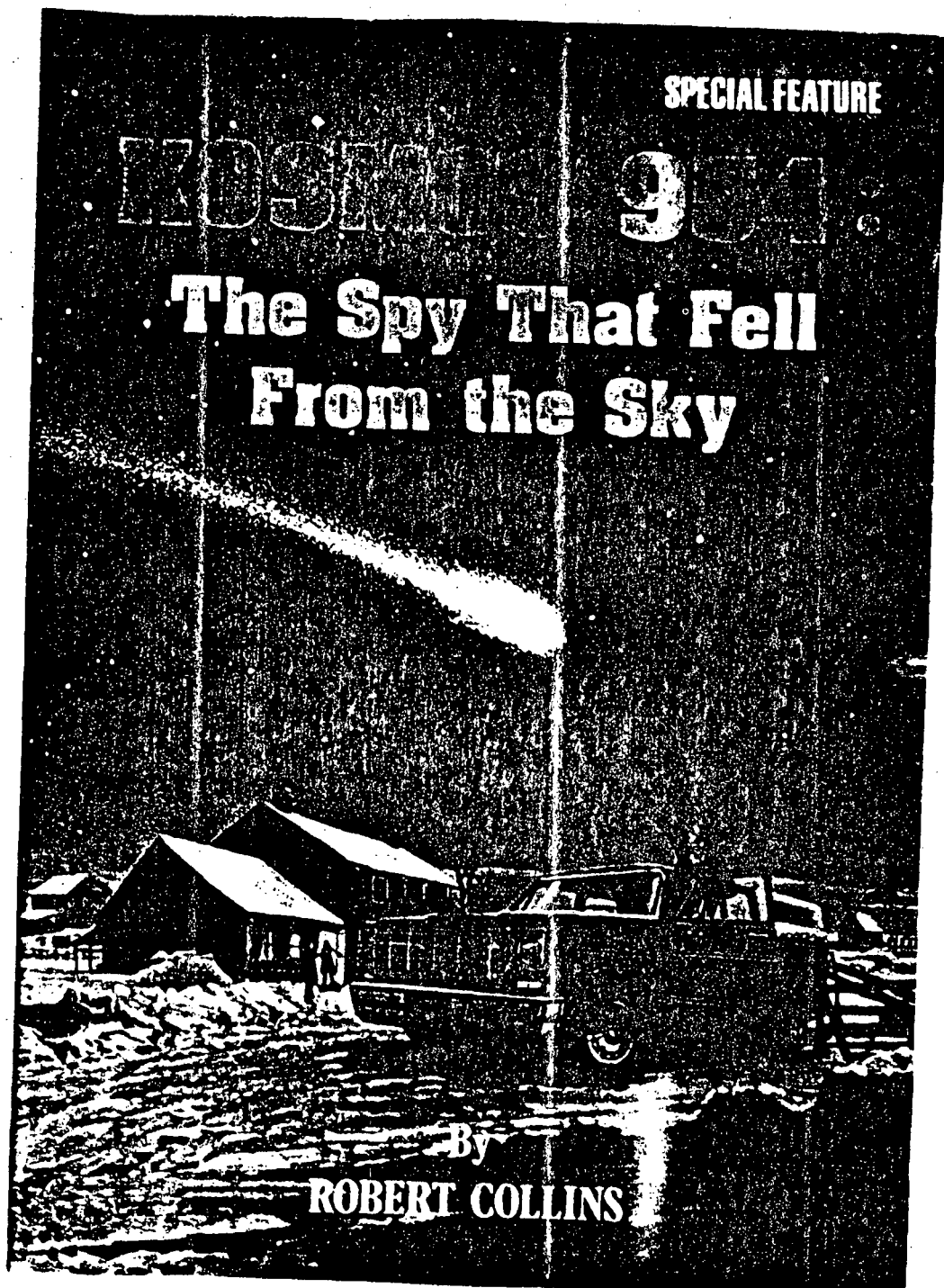
Attention: Dr. A.G. Darnley 2

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READER'S DIGEST August 1978





## KOSMOS 954:

### The Spy That Fell From the Sky

By  
ROBERT COLLINS

*On September 18, 1977, Kosmos 954 roared into the sky from the Soviet Union's biggest space launching site. Its mission: To gather intelligence data on the port installations and movement of Western naval fleets. Early in November, however, something went badly wrong and the spy satellite began drifting slowly out of orbit, heading back to earth, some 160 miles below. Now it became the object of intense international effort, its death throes monitored by tracking stations around the world. In the urgent weeks ahead, the saga of Kosmos 954 would assume the dimensions of a space-age thriller.*

IT CAME skimming out of the cloudless black sky over Yellowknife, N.W.T., at 4:55 a.m. last January 24. Mrs. Marie Ruman was leaving home after a coffee break to return to her overnight office-cleaning jobs downtown. Shivering in the -40° cold, she huddled in her red van, staring absently out the windshield as the motor warmed up, when a shimmering orange-white light loomed in the southwest.

A burning plane? No! As it drew closer, trailing a fiery wake, she startled Mrs. Ruman saw clearly that it was not an aircraft shape.

"Kathy! Danny! Come quick!" she cried, wildly beeping her horn. Her son and daughter, ages 14 and 20, rushed out on the step in their stocking feet.

The "thing" seemed nearly overhead now, almost fluorescent in its whiteness. It sailed so silently that the Rumans' two dogs didn't stir.

ILLUSTRATION: DAVID CRAIG

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Each of the countless small shapes behind it had a flaming tail. Was it a meteor? If so...

"How could all those big rocks stay up there?" blurted Mrs. Ruman.

"Oh, and there's no film in the camera!" wailed Kathy. Nor was there time to load one. Swiftly, noiselessly, the reddening pieces vanished over the eastern horizon, leaving the Rumans wide-eyed and chattering in the dark. What was it?

Shortly after five o'clock, Mrs. Ruman reached work at Yellowknife's CBC radio station. She told the morning announcer of the strange sighting.

"You've been seeing UFOs!" he laughed.

"I don't believe in them!" she retorted. She phoned the local weather office to ask about any reported meteorites. Just then the announcer hurried back. Other reports of a mysterious object were trickling in; he wanted her to tell her story on the morning news.

Within three hours, an announcement from Ottawa resolved the mystery. Marie Ruman was one of a privileged few: she had witnessed the plunge to earth of a spy from the sky, Russia's surveillance satellite, Kosmos 954.

She finished her work and went home, but did not sleep. For the next 20 hours, her telephone shrilled with calls from news reporters as far away as Australia. The world had learned the basic

chilling fact: it had been menaced by a lethal, man-made object from outer space. Kosmos 954 was a flying *nuclear reactor*, fueled with 110 pounds of fissionable uranium. Now its deadly remnants lay somewhere in the Canadian north.

THE story began on September 18, 1977, near the rail-stop village of Tyuratam in Kazakhstan, some 1250 miles southeast of Moscow. Here on flat open steppe country lies the largest and most versatile of the Soviet Union's three space-launching sites. Nearby, the new city of Leninsk, rarely found in atlases, houses some 50,000 people associated with the space industry. All the early Sputniks, all the manned, lunar and planetary flights and the earliest Soviet intercontinental ballistic missiles were fired from this site.

And here at 5:48 p.m. local time — midmorning in eastern Canada and the United States — Kosmos 954 thundered skyward aboard its launch rocket and began girdling the earth at 17,000 m.p.h. It joined more than 900 other satellites still aloft: other electronic spies plus weather, scientific and communications satellites, most of them Russian and American. All share the skies with nearly 4000 other pieces of orbiting space junk.

Under international treaty, the Soviets were obliged to inform the United Nations Secretariat of the launch. They did, in brief terms,

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stating its purpose as "investigation of the upper atmosphere and outer space." The Moscow newspaper *Pravda* added, on September 20, that this "continuing research into space" was aided by a radio telemetry system on board for relaying data to Russian receiving stations on earth.

But American and British intelligence forces knew and surmised much more. They knew that Kosmos 954 circled the earth at an altitude of 162 to 165 miles, crossing the equator at a 65-degree angle. Shifting over a trifle with each orbit, rather like the winding of a ball of string, it soared over the Indian Ocean, around Australia, across the Pacific, over North America, down the Atlantic and across Africa - a complete orbit every 89.6 minutes. They reckoned that Kosmos 954 was about 46 feet long, weighed 10,000 to 12,000 pounds and was shaped rather like a stubby cigar. It was believed to consist of three parts: a nuclear power source with its own rocket engine, an attitude stabilization platform to keep it on an even keel and a radar unit capable of forming microwave images, similar to black-and-white photography. Its mission was to spy on the naval fleets of the Western World.

#### Space-Age Vigilantes

How could the West deduce so much with so little help from

Russia? Within minutes of launch, Kosmos 954 was spotted by electronic "eyes" around the world. Many are linked to the North American Air Defense Command (NORAD) headquarters, an American-Canadian steel fortress inside a chamber carved from the granite heart of Cheyenne Mountain, near Colorado Springs. NORAD's prime function is to guard this continent against aerial attack. But its associated Space Defense Center tracks everything circling high above our heads, from satellite fragments the size of a golf ball to the 170,000-pound U.S. space station, Skylab.

The Space Detection and Tracking System (SPADATS) is a far-flung network of radars, cameras and radio-receiving equipment. It employs satellites with infrared detection capabilities, space-watching cameras (two located in Canada) so sensitive that they can photograph an object the size of a basketball more than 20,000 miles out and new computer-controlled radars that can span vast swaths of space in fractions of a second. The NORAD warning systems, the U.S. Naval Space Surveillance System and the National Aeronautics and Space Administration (NASA) all contribute data.

Many other space-age vigilantes keep tabs on the Russians. The Royal Aircraft Establishment at Farnborough, England, is famed for its meticulous records of launch

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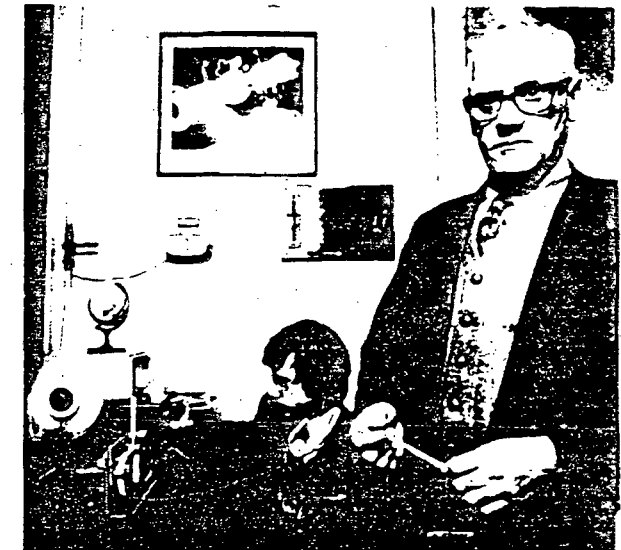
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times, orbits and the shape and weight, of orbiting objects. The world's foremost private observers are Britain's Kettering Group, headed by 50-year-old Geoffrey E. Perry, Senior Master at Kettering Boys School in Northhamptonshire. For 21 years, Perry and his science students, aided by civilian spotters in Sweden, West Berlin, Trinidad, Bahrain, Florida and Texas, have monitored the Soviet space program with uncanny accuracy.

Much of the work is done during the 90-minute school lunch period - just long enough to scout one orbit of most satellites. The equipment, though reliable, is unsophisticated: an aerial may consist of a piece of wire slung between two convenient buildings. But by deftly intercepting and decoding Russian space signals and by poring over unclassified reports, the group has scored coup after coup. (Perry assiduously shuns official roles and secret information so that he can freely publish everything he learns.)

In 1966, Kettering was the first to announce the existence of Russia's third launch site, near Pleseetsk, now the busiest in the world. (The Russians still haven't officially acknowledged it.) Perry and his boys picked up signals from the

first Chinese satellite within minutes after launch in April 1970, and within a month had decoded its transmission: it was playing a Chinese socialist anthem, "The East Is Red," interspersed with telemetry radio signals. Again and again Kettering announces a Russian launch before the official Soviet communiqué, and predicts accurate landing times. In recogni-



Geoffrey Perry and Andrew Driver, the boy who traced Kosmos 954, using simple equipment. Perry and his British schoolboy space watchers have been tracking satellites for 21 years

tion, Perry has won the MBE and a Royal Astronomical Society prize.

WITHIN the first day of launch last September, all of the West's professional space watchers were on to Kosmos 954. Since 1967 they

PHOTO: RIC GEMMEL/NEW SCIENTIST

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had regularly monitored 15 previous Kosmos launchings in this series. (The "Kosmos" name has been used since 1962 to disguise all manner of peaceful and military satellites.) Each of the 15 had followed a similar path and relatively low orbit, usually for a month or two. Then they abruptly soared to 560 to 590 miles above the earth and stayed there.

Why two levels of orbit? Piece by piece the space watchers put together the puzzle. The Kosmos of this series were ocean spies, probably using a powerful "side-looking" radar, and able to reproduce distinct images of shipping and port installations, day or night, in any weather. To do its job, the radar had to be in low orbit, capable of sweeping large areas of ocean with enough strength to bounce back a clear signal.

Such radar requires greater power than solar cells can deliver, particularly when every orbit passes through the earth's shadow. As Geoffrey Perry noted, such power "could only be conveniently supplied by a radioactive source."

This explained the satellite's sudden rise to 560 miles or more. When its sensors and processing equipment had deteriorated and the spy had outlived its usefulness, an electronic signal from Russia released the nuclear fuel section, rocketing it high above the atmosphere to orbit for 500 to 1000 years until, theoretically, its radio-

activity decayed to a safe level. Harmless remnants stayed in low orbit where the drag and friction of atmosphere eventually plucked them down and burned them up. These and other fragments of space junk have occasionally come to earth without attracting public attention.

Latterly, Kosmos satellites have been launched in pairs a few days apart, all the better to spy upon us. By comparing signals from a pair covering the same track, Russia could not only locate ships but trace their movements. Kosmos 954 fitted the pattern in every respect. Its companion, Kosmos 952, went into launch orbit on September 16 and in early October was fired high. Surely 954 would follow suit, perhaps by mid-November.

In Colorado Springs, although SPADATS makes 20,000 observations a day, every satellite cannot be watched every moment. Like all new entries, Kosmos 954 was given an "element set": a mathematical description of its orbit. Then, in frequent fast scans of the skies, computers could pick up the slightest deviation from its course.

At the Kettering School, each new satellite is assigned to a pupil as a personal project. On October 13, the senior boys of satellite watch were temporarily relieved of duty to concentrate on their studies. Fourteen-year-old Andrew Driver took over Kosmos 954, a

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project he thought would last about a month.

For a while the spy behaved as expected, skimming silently through day and night, 16 times every 24 hours, busily transmitting coded data with each pass over the seas. Periodically — as the thin cloak of upper atmosphere tried to tug it down to earth — a brief burst from its engine jogged the satellite back into position.

Below, young Andrew dutifully recorded these regular course-corrections as a sawtooth line on a graph. Then, around November 1, the little jogs stopped. By November 8, it was clear to Andrew that Kosmos 954 was malfunctioning and had begun a long, slow decline. Driver and classmate John Kellet drew a line predicting that the satellite would burn into the atmosphere in early April, unless the Russians managed to retrieve it.

About the same time, Colorado Springs reached the same conclusion. Kosmos 954 was losing speed, first at one tenth of a minute per orbit, then two tenths. Air Force Capt. David R. Tohlen, chief orbital analyst, and his team of 28 specialists, began to pay particular attention. "We knew it was an important satellite," Tohlen remarked later in his Oklahoma drawl, a tacit admission that they guessed it had a nuclear payload.

Nuclear-powered satellites are becoming distressingly commonplace. At least 11 are now in high

orbit, where they are expected to remain for several centuries. All but one of the U.S. nuclear satellites to date have used a radio-isotope thermoelectric generator (RTG) using plutonium 238. If nuclear power *must* be orbited over our heads — an arguable point — this is a safer technique. If put into high orbit, plutonium 238 would decay to less than three percent of its original radioactivity in 500 years. If it fell to earth prematurely, the power pack — shielded with heat-absorbing ceramic material inside a steel container — is designed to survive a crash. If radiation *were* released, it would mainly consist of alpha particles, very dangerous if swallowed or inhaled, but unable to penetrate even a sheet of paper.

By contrast, a uranium reactor produces alpha, beta (deeper penetrating) and the very deep-reaching gamma radiation. One of its products, plutonium 239, has a half-life of 24,360 years (it takes that long to lose half its radioactivity). However, such a reactor generates more power than an RTG.

Now NORAD wondered: would an RTG provide enough power for 954's radar, or was a reactor on board? And if it crashed, would the reactor burn up on the way down, or survive to spew its dreaded radiation on earth? The American and British space watchers waited into December, monitoring a flow of urgent signals from

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Russia as the Soviets desperately tried to get the crippled spy up out of the atmosphere. It did not respond.

On December 1, the U.S. Defense Department quietly began analyzing the possibilities. Crash or no crash? Crash on water or crash on land? The odds against the last were high — three quarters of the satellite's orbit was over water — and the likelihood of a landing in a populated area was even more remote. But, as one space official said whimsically, "It's anybody's guess where the Lord's gonna put it."

#### Preparing for the Worst

ON DECEMBER 12, the word came from NORAD to Capt. Mike Barrow, head of Canada's National Defence Operations Center in Ottawa. The quiet, graying captain commands a windowless war room with a door like a bank vault that yields only to a push-button code and an identification card thrust into a slot. Bristling with computer consoles and telecommunications hookups, it is the nerve center for the Canadian Forces at home and abroad. Barrow immediately relayed the information about the errant satellite to the Chief of Defence Staff, Adm. Robert Falls.

"Let me know if anything changes," Falls said.

One week later in Washington, National Security Adviser Zbigniew

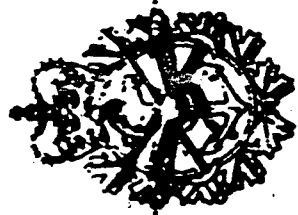
Brzezinski appointed an inter-agency task force to explore all the ramifications of a nuclear emergency. To head it, he chose 39-year-old nuclear engineer Ben Huberman, who quickly hand-picked a team of space, nuclear and disaster relief specialists from NASA, the CIA, Civil Defense and the Departments of State, Defense and Energy.

"We're nearly a 100 percent sure it's nuclear," Huberman told them. "We still don't know if it will reenter the atmosphere, but we have to prepare for the worst." The worst meant: *if* the Russian reactor has not been designed to burn up on reentry; *if* it was not housed in a crash-proof, heat-resistant shielding; *if* it crashed in a populated area; *if* it emitted penetrating gamma radiation. It could be, as Huberman summed up later, "a highly dangerous and scary situation."

The probability of so many "ifs" coming true seemed remote. But the task force began setting up search, decontamination and clean-up plans, just in case. President Carter, himself a nuclear engineer, was regularly briefed in his early morning sessions with Brzezinski.

ON DECEMBER 28, Prime Minister Trudeau, on a skiing vacation, visited Colorado Springs. The case of Kosmos 954, deemed likely to crash somewhere sometime in the spring, apparently did not loom





large in his briefing on that occasion. But ten days later everything changed. On January 6, Kosmos 954 suddenly went askew. From a steady slow decline it began to lose altitude rapidly. Evidently its stabilizer controls had failed, causing it to tumble in orbit, drastically increasing drag and reducing its life-span in space. From Colorado Springs, Farnborough and the Kettering School came almost identical predictions: the spy would fall about January 23 or 24.

In the Washington offices of the U.S. Department of Energy, Col. Roy Lounsbury, the tall, lean assistant director of Safety, Environment and Emergency Actions, had known the satellite was in trouble since December and had quietly made preliminary plans. Now, as he later recalled, "we really got cracking." Cleaning up radioactivity is no new problem for his department. Its Nuclear Emergency Search Team (NEST) is constantly poised to cope with any kind of nuclear accident. If a truck or train carrying radioactive materials is in an accident or simply drops a container, as has happened, NEST specialists rush to the scene and decontaminate any spillage. But as Lounsbury said, "We hadn't chased satellites before."

In the event, he and his staff devised a plan that would serve anywhere in the United States and could be adapted elsewhere if another country needed help. The

instant Kosmos 954's impact site was known, the State governor, the civil defense organization, the FBI, local sheriffs, police chiefs and radio stations would be notified. Their job would be to alert citizens, ease unnecessary fears and keep people away from danger while NEST teams flew to the spot and mopped up.

But just what was the potential danger? Huberman's task force urgently needed to know the exact nature of the fuel. Not a word had come from Russia. Should they ask the Soviets? How much could the United States admit to knowing without giving away its own intelligence secrets? And if the Russians said, "No comment," what then?

Nevertheless, they had to be asked.

#### Message From Moscow

ON JANUARY 12, Brzezinski invited Soviet ambassador Anatoly Fedorovich Dobrynin into his vast, high-ceilinged White House office for a chat. Tall and jovial, with flawless English, Dobrynin has been dubbed "Washington's favorite Russian." On one occasion he had brought vodka and caviar to a White House meeting with Brzezinski.

The meeting this day was less festive. One of Russia's satellites appeared to be in trouble. Brzezinski said. Was this true? If it came to earth, would it pose any threat to human life? Specifically,

did it carry a nuclear reactor? Dobrynin seemed genuinely surprised. Like most others around the world, he evidently hadn't heard about the faltering Kosmos. He promised to get the answers.

Two days later a brief message came back: yes, the satellite used nuclear fuel, and they *had* lost control of it. In meetings and phone calls over the next seven days, Brzezinski eked out a few more facts: 954 was fueled with enriched uranium, U235, but would not explode on impact. It was designed to burn up on re-entry. But this, of course, did not guarantee that it would, and on January 17 a half-dozen key Congressional leaders were briefed on the situation and the Department of Energy was made the lead agency responsible for the cleanup.

Almost daily since January 6, the task force had hotly debated whether to tell the public, or at least the heads of the scores of countries beneath 954's path. But tell what? That a nuclear satellite might reenter and, if it didn't burn up, had about a 25 percent chance of coming down on land? "Do we tell the world to shut down for three or four days?" somebody asked. Each time, the task force unanimously agreed not to make a public announcement in order to avoid unnecessary panic.

But on January 18 the U.S. informed its NATO allies and other friendly countries that might be

affected, such as Australia, New Zealand and Japan. That same day in Ottawa — where not much was happening because not much was known — Capt. Mike Barrow heard from NORAD that 954 was definitely nuclear and due to crash in six days. He briefed Admiral Falls, Defence Minister Barney Danson was advised. The Prime Minister was brought up to date upon his return from a Liberal Party meeting in Toronto.

On Friday, January 20, seven Canadian government agencies — including the Atomic Energy Control Board (AECB) and representatives of National Defence's little-known Nuclear Accident Support Team (NAST) — met in Ottawa to make emergency plans. Based at eight Canadian military installations, NAST units include fire fighters, medics, security officers and a radiation monitoring team. All the NAST teams went on standby for the weekend. Emergency Planning Canada, the nationwide federal agency set up to cope with peacetime disasters or nuclear war, would ensure that all levels of government would be alerted and the public warned. If the satellite crashed in Canada it would be up to NAST and the AECB to bear the brunt of the cleanup.

#### The Death Run Begins

BY SUNDAY afternoon, January 22, the United States was poised and

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ready. Five C-141 Starlifter transports, loaded with NEST equipment and fueled for takeoff, waited by runways at Air Force bases in Washington, Las Vegas and California. Aircrews and more than 100 Department of Energy specialists stood on two-hour alert: nuclear scientists, health physicists, data analysts, communications teams, clerks, scientific photographers and people who knew how to package nuclear debris. But still Kosmos 954 clung to the sky.

In Colorado Springs, Capt. Dave Tohlen worked from 3 a.m. until noon on Monday, went home for a sleep and was called back four hours later. "It was starting to snow, our baby was due and my wife had already had one false labor," Tohlen recalls. "She wasn't very happy with me."

The windowless, 30-foot-square operations room of the Space Defense Center, normally staffed by a half-dozen men, was a bedlam of jangling telephones and blinking computer consoles and packed with civilian specialists and officers of all ranks. It was no time for pulling rank. As Lt. Col. David Schneekloth, assistant chief of the center, talked into two telephones at once, a third rang at his elbow. Schneekloth poked his elbow into the nearest two-star general, who obediently answered the phone.

The atmosphere was electric. With Kosmos 954, now only 90 miles up, two months of arduous

tracking were nearly over. From time to time the consoles displayed the satellite's path or "ground trace," translated from computer data into a white line superimposed on a map of the world. When would it crash? Where? By early evening, the center could only predict that it would *not* come down in Russia. Computer forecasts were run and rerun. The predicted impact point moved back from the tip of Africa, to the Atlantic, then across Canada, then to the Pacific. At another control center in Germantown, Md., outside Washington, Roy Lounsbury sat up all night watching the data flow from Cheyenne Mountain, waiting to see if and where he should despatch NEST teams. As 954's hours ran out and the possible impact zone shifted and narrowed, he called out "safe" places: "Cross off New Mexico" or "Okay, it won't hit Montana."

The clock ticked into January 24. At 3:29 a.m. Mountain Standard Time, Kosmos 954 began its death run around the earth. It swung across Hudson Bay and the southern tip of Greenland, sped over the heart of Africa and cut back between Australia and New Zealand. Around 4:40 a.m., a ground station at Hawaii tracked it flaming in at 280 miles per minute.

Even then, 954 might have nosedived into the Pacific or skipped off earth's atmosphere somewhere far beyond. But it planed down in

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a steady path, burning into the atmosphere over the Queen Charlotte Islands at 4:53 a.m. Disintegrating, seeding the upper air with radioactivity, scattering an escort of broken bits behind it, the shattered satellite fell east of Great Slave Lake a few seconds past 4:56 a.m.

## Call From the White House

IN WASHINGTON, incessant phone calls to his home finally drove Ben Huberman out of bed at 4 a.m. The calls followed him to his office in the ornate Old Executive Office Building next door to the White House. A few minutes before seven, Eastern Standard Time, the crucial message came from Colorado. Huberman immediately rang Brzezinski, who was also at work.

"The Springs tracked it in a moment ago, in northwestern Canada," Huberman said. "Should we ask the President to call Prime Minister Trudeau?"

Brzezinski quickly stepped next door to the Oval Office where the President was at his desk. Yes, Carter agreed, they should offer assistance to Canada immediately.

In Ottawa at that moment, all was relatively serene. Captain Barrow was driving to the Defence Operations Center, where a normal complement of men had been in touch with Colorado Springs all night (but had not yet received word of the crash). Defence Minister Danson was at home getting

ready for breakfast. Ivan Head, foreign policy adviser to the Prime Minister, was preparing to shave. The Prime Minister was asleep.

When Brzezinski placed Carter's call to the Prime Minister's office over a regular Bell wire shortly after seven, the PMO switchboard relayed it to executive assistant Robert Murdoch. Trudeau was still at home, Murdoch explained. "Do you want the call put through right away?"

"Yes, please," said Brzezinski crisply. "The President has an important message regarding the Soviet satellite."

Up to this point, Trudeau's interest in Kosmos 954 had been, by his own admission, remarkably restrained. As he explained it to a press conference later that week, "I know there are things up there. I know they are going to fall some day, but I don't want to hear about it until it looks as if they are going to fall in my country."

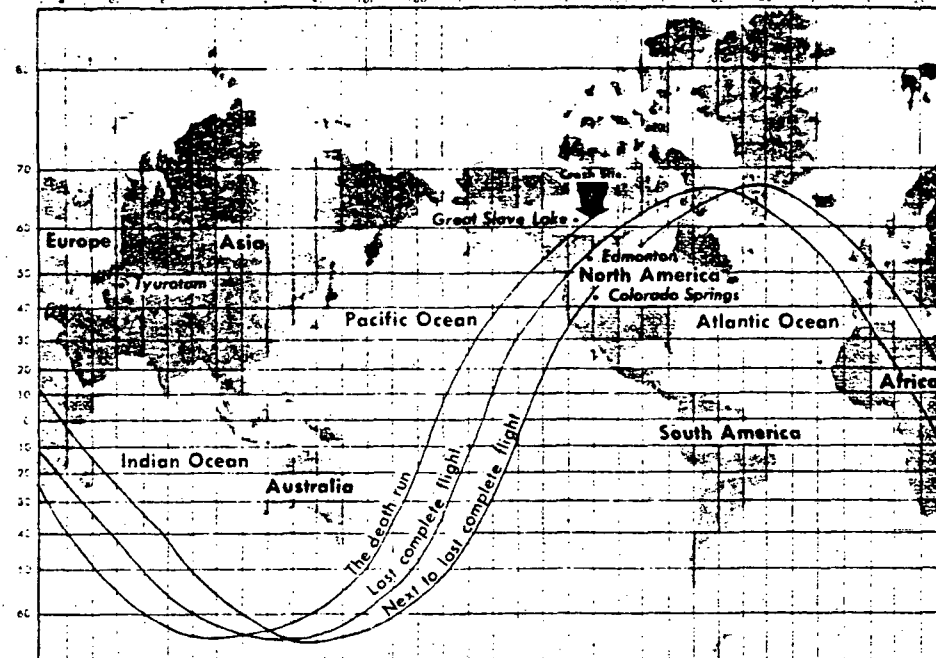
Now he arose to hear that one of them *had*. U.S. radar had tracked it in, said Carter. Airplanes and experts were waiting on runways, all at Canada's disposal. Trudeau thanked the President; he'd check on whether Canada needed help and call back in a few minutes. Meanwhile Brzezinski phoned Ivan Head with preliminary map coordinates of the impact zone.

"I had the telephone in one hand and a razor in the other, with

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Launched from Tyuratam, Kosmos 954 orbited the oceans spying on the movements of western fleets. Its final run, traced by NORAD in Colorado Springs, ended in the N.W.T.

shaving cream all over my face." Head confessed later. "Rather than admit to Zbig that I wasn't already at my desk, as everyone in the White House obviously was, I memorized them on the spot. Then I had a few bad minutes, wondering if I'd got them right!"

Almost simultaneously the word came to National Defence from NORAD. Within 45 minutes all key participants in Ottawa had been alerted and Canada had accepted the U.S. offer. At 9:30 a.m. by the Peace Tower clock, Head phoned the story to Canadian Press. In Colorado Springs, the "three Daves" - Schneekloth, Tohlen and chief deep space or-

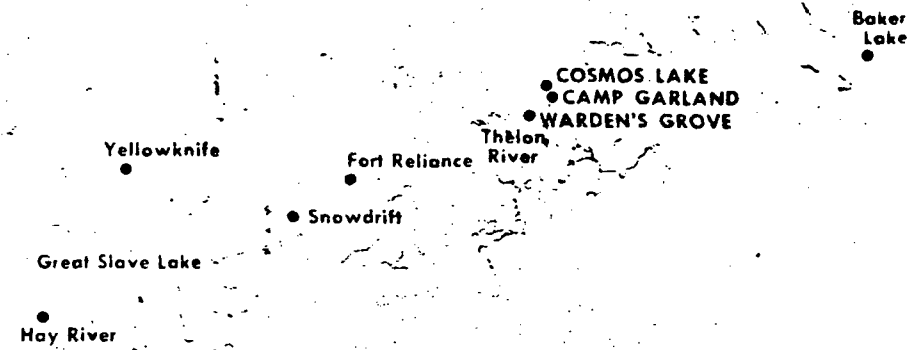
bital analyst Capt. David Doughty - worked nonstop until 1 p.m. pinpointing the crash site.

Their computation would prove to be a masterpiece of accuracy: 62.7 degrees north latitude and 111 degrees west longitude, plus 500 miles. This meant that the impact zone started approximately 100 miles east of Yellowknife and 25 miles north of the village of Snowdrift at the eastern tip of Great Slave Lake. Now every eye in North America turned on the Northwest Territories.

#### Operation Morning Light

THE 500-mile stretch east from Great Slave Lake to Baker Lake

#### SEARCH AREA



Fragments of the shattered Kosmos fell over an area stretching east from Great Slave Lake to Baker Lake. Air and ground teams had to search this barren land in bitter -40° cold

is bitter and bleak or wildly beautiful, depending on the season. Here, the scraggly stunted bush of the western Territories gives way to the Barren Lands. In summer the Barrens are an enormous sponge: countless small lakes interspersed with rock and tundra, speckled with subtle mosses and delicate flowers. But on this January day, the Barrens were an ocean of wind-rippled snow, crusted over by -40° cold.

In some respects it was the worst possible place for a search, flat white on cloudy days, dazzling white in the sun, with few landmarks to guide tired eyes. But there were advantages. The area is thinly populated, containing only Snowdrift, a trappers' village of about

250, Fort Reliance, a weather station and Baker Lake, a predominantly Inuit community of about 1000. Yellowknife's 10,000 people were outside the estimated impact zone. The threat to humans was therefore low, and the chances of finding Kosmos were high, because the region is patrolled by one of the finest search-and-rescue units in the world.

Col. David Garland, 43, the tall, trim commander of Canadian Forces Base, Edmonton, was at work when his orders came through at 8 a.m., M.S.T. He would head up this search, to be known as Operation Morning Light. The assignment exhilarated him. A cool, quick-thinking pilot with 23 years' service, he had been braced for

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this particular emergency since the weekend. His fliers, as always, stood ready to search anywhere from the Rockies to the Great Lakes and from the U.S. border to the North Pole. "We're spring-loaded!" Garland said proudly.

Within an hour, an emergency command post was operating and a NAST unit was gearing up to go to Yellowknife, 634 miles north. Soldiers and RCMP began interviewing the half-dozen scattered northerners who had sighted the burning Kosmos. Four C-130 Hercules transports were groomed for action. The four-engine, turboprop Hercules resembles a pregnant duck, but, in fact, is one of the world's most versatile aircraft. It can take off and land on short rough strips and cruise 3500 miles carrying 225 tons. Its rear end opens wide to load or unload anything from tanks and trucks to 64 paratroops. It would become the workhorse of the search.

At 5:30 p.m., two U.S. Starlifters disgorged equipment and 110 specialists at Base Edmonton. While U.S. detection gear was fitted into the Hercules, NAST teams were checking Yellowknife with air sampling machines and alpha-beta-gamma detectors. They wore garish yellow oversuits, taped tight at wrist and ankle, and carried gas masks. The news was good: Yellowknife was "clean."

Now began the long frustrating search for the potential killer, a

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time of sleepless nights, feats of skill and flukes of fate. At 1:15 a.m., January 25, the first Hercules was aloft with a Canadian aircrew and American scientists. Three more soon followed, and for the next several days they flew around the clock.

They divided the 500-by-30-mile span into ten grids and swept it methodically, first from 1500 feet, then 750 feet, following imaginary straight lines at 180 m.p.h. over the eye-aching emptiness below. Inside the Hercules' bellies, scientists hunched over sensing machines, watching for the jump of a needle and the blip on a graph that might indicate a "hit." Back at Edmonton, graphs and tapes were analyzed; each hour of flying time required four hours of computer study.

It was like looking for a needle in a snowbank. Radiation from fragments rises in a narrow beam, difficult to detect above a thousand feet. A hit could be overflowed in seconds. Natural radiation from ore deposits sometimes sent up false alarms. One such false hit — as it later proved to be — came at 9 p.m. the first day. It was enough to bring a five-man AECB team from Ottawa, and send a NAST team to Baker Lake.

The Inuit of Baker Lake were torn between alarm and curiosity at these strange beings in yellow suits. At meetings of adults and school children, the NAST mission



tried to explain a nuclear accident to people who still hunt and kill their own food and travel with sled dogs. No, the team assured them, the airport would not be closed and Baker Lake would not be evacuated. But, yes, a dangerous thing had happened: a poisonous object had fallen from the sky (there is no word in Inuktitut for "radioactivity").

"If you find strange pieces, stay away from them. They won't hurt unless you pick them up."

"But what will happen to the caribou? What if they lick the pieces?"

"Then," said the NAST teams sorrowfully, "they might get sick and die."

The people of Baker Lake exchanged worried glances. What madness was this?

#### T-Shirts and Snowshoes

ANOTHER kind of madness was sweeping the north. Newsmen and women swarmed into Edmonton from all over the continent and beyond, jockeying fiercely for position. A contingent of Japanese, whose interest was born at Hiroshima, arrived shivering in spring topcoats. ABC-TV chartered a Lear jet for eight days to fly out its film. One U.S. journalist telephoned a Yellowknife hotel with a request form for rooms and snowshoes, adding, "Here are our shoe sizes . . ."

Yellowknife viewed the fuss with

barely restrained hilarity. An entrepreneur turned many quick dollars selling T-shirts (\$5.75 and up) showing a raven, the familiar denizen of Yellowknife's streets and garbage cans, astride an incoming satellite, croaking, "What, me worry?" It was a fair reflection of the local mood. The visiting media searched in vain for signs of panic. But as a Yellowknife newspaper observed, "Just to come up here to live takes a certain kind of person — self-sufficient with a somewhat fatalistic outlook and plenty of plain intestinal fortitude. By now (southerners) should know we are different."

AT FIRST, the mild manners of Bob Grasty and Quentin Bristow were lost amid the ubiquitous sound and fury. But this modest pair from the Geological Survey of Canada were about to become the temporary darlings of the fickle media. All through the predawn hours of January 26, they labored in the bowels of a Hercules, installing a \$225,000 oblong blue box. It was a gamma ray spectrometer, designed by Bristow in Ottawa four months earlier for geological surveying and more sensitive than any American instruments on the scene. It could distinguish between natural and man-made radiation sources, and its built-in computer could analyze data on the spot. But it was tested only twice and never used on a

real assignment. Would it work?

That morning Bristow flew with it over the Barrens. Nothing. Grasty took the next shift. All through a cold and crystal-clear night the Hercules crisscrossed a segment of the search zone. Toward dawn on January 27, haggard from two nights without sleep, Grasty bent over the graph paper.

"I think we've got a hit!"

It was just a squiggle, near the Hoarfrost River, a tributary feeding the eastern end of Great Slave Lake. But a later flight with American equipment confirmed it. A definite hit, and only three days after impact. The modest geophysicists had come to grips with Kosmos 954!

#### Don't Touch

SOME officials had been minimizing the radiation hazard, partly because they didn't understand it, partly to counter scare stories in the press. But the threat was real and none knew it better than the ranking scientist, Geoffrey Knight, the courtly, gray-haired health physicist from the Atomic Energy Control Board, and his associate Dr. Roger Eaton.

Radioactivity, however slight, must be treated with great respect. It cannot be seen, heard, smelled or tasted, yet when it strikes a human body it disrupts the atomic structure of the cells. In normal life, each of us receives and can tolerate small amounts of natural

or man-made radiation. Excessive doses can kill.

Knight and his associates knew that the remnants of 954 might include small dustlike fragments, larger pieces, even a chunk of the nuclear core. The core would be lethal to anyone near it. Small pieces, if not from the core or not heavily irradiated by it, would pose no great hazard unless some innocent carried them around; then they could cause painful ulcers or worse.

Dustlike particles could become suspended in the air and inhaled, caught in the snow and swallowed (bush dwellers often drink melted snow water) or cling to the hands and be accidentally wiped into the mouth. Would this be serious? It would depend, said Knight, on whether the nuclear material was soluble or not. The Russians hadn't told.

Insoluble radioactive dust entering the body would likely pass through the alimentary tract, radiating as it went, perhaps not in lethal amounts but increasing the chances of cancer. Dust particles suspended in a lung could hasten cancer. Soluble dust could be absorbed into body fluids, perhaps concentrating in vital organs or bone cells. Over months or years it could be fatal.

As well, radioactivity might seep into northern soil and water, ultimately finding its way into animals and fish, and so perhaps into

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humans. Finally, there was a slight but real possibility that Kosmos 954 would act differently on the ground than it had in space.

In a power plant, a substance such as heavy water is used to create a *controlled* nuclear reaction. What if a chunk of Kosmos 954's core had come through intact, the scientists speculated? Could the tremendous heat generated when the radioactive core struck the earth start an *uncontrolled* reaction? This was no scientific pipe dream; at least one natural fission reaction had happened in the past.

All these possibilities, however slight, lent urgency to the search. Garland now had 16 fixed-wing aircraft and helicopters aloft; fuel and maintenance costs alone ran as high as \$1750 an hour. Instruments in high-flying U.S. aircraft sampled the upper atmosphere for the radioactive cloud that had not yet settled to a detectable level but, the scientists guessed, eventually would.

Bob Grasty's hit was marked until AECB cleanup teams could be flown in. NAST teams meanwhile set out to test the people of Snowdrift and Fort Reliance. The military took pains to warn isolated northerners. When Lt. Col. Alex Bialosh discovered that Eddie Drybones, a Chipewyan trapper, was out on his trapline, he left a note in Drybones' tent saying, in effect, "If you find anything strange in the

snow, refrain from touching it; inform the authorities immediately."

### "You Found It!"

FAR from the madding crowd (so they thought), the six young adventurers puzzled over the persistent drone of planes above them. Heavy traffic over the desolate Barrens was rare.

The five Americans and Robert Common of Ste. Anne de Bellevue, Que., strong, self-reliant young men, were halfway through a 15-month odyssey testing themselves against the wilderness. Partly, they were retracing the ill-fated journey of explorer John Hornby and two companions who died of starvation in 1927, and doing some government wildlife surveying and weather reporting on the side. Now they were wintering in a cabin at Ward-en's Grove, amid a finger of scrub timber poking into the Barrens.

On Saturday, January 28, Gary Anderson, Kurt Mitchell, Chris Norment and Common were in camp. Mike Mobley of Mesa, Ariz., and John Mordhorst, from Rock Island, Ill., were on the third day of a short exploratory trip with a sled and six dogs. About 3 p.m. they rounded a bend in the Thelon River and pulled up short. A mysterious object darkened the blank white landscape.

Animal diggings? No, on closer look it was a tangle of twisted, blackened metal struts, protruding from the snow. Gray dust stained

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Mobley, a psychologist and teacher, put his analytical mind to work. "Crater looks fresh. Pockmarks all around. Obviously it was something very hot."

Maybe they could reuse it. Lying off the land in the north, one learns to salvage everything. Mobley touched a metal prong with his mittened hand. It was frozen firmly in the ice.

A stiff wind multiplied the -38° cold, whipping it through their clothing. No point in standing around in the open. Better to cancel their side trip, return to camp and try to solve the mystery by shortwave radio. Three hours later, Chris Norment came out to help unharness the dogs.

"Why are you back so soon?"

"Well, we saw some strange things out there."

"What strange things?" Norment said, suddenly excited.

"Well, some funny looking pieces of metal, might be from an aircraft. They looked very new..."

"You found it, you found it!" yelled Norment. "They told us over the radio... a Russian satellite crashed... you found it!"

"Oh, come on!" scoffed Mordhorst in disbelief.

But a message to Yellowknife, relayed through Fort Reliance, confirmed it. "Don't go closer to that thing than a thousand feet!" warned the radio voice.

"Can't quite do that," Mobley replied lightheartedly. "Already touched it!"

"Stand by," came the reply. "Somebody will be out tomorrow."

There was a strange joking tension in camp that night, though not particularly based on fears of radiation. "For the first time in months," mused Mordhorst later, "we felt we were not in control of a situation."

And indeed they were not. The outside world swept them up in a whirlwind. At 2 p.m. the next day a Twin Otter arrived from Yellowknife, closely followed by a Chinook helicopter from Baker Lake. The six trotted out cheerfully to greet their visitors, but the latter were in no rush to reciprocate. Only a doctor and radiation technician stepped forth.

"Unclean, unclean!" shouted Mordhorst and Mobley, pointing to themselves. The Otter pilot threw up his arms in mock alarm - but he stayed on board.

"How do you feel?" asked Dr. Savino Cavender, the U.S. medical expert on radiation, casually disguising his concern. Fine, they said. Cavender and the technician did a radiation count. The six were pronounced clean (although Mordhorst's mates, in raunchy good humor, pointed out that he hadn't yet had his Saturday night bath). Mobley and Mordhorst guided soldiers and a health physicist to the crater.

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The others flew to Yellowknife and stepped into a carnival scene of blazing television lights and packs of jostling reporters behind a cordon of soldiers. They sped to hospital with a police escort. By morning, their only ill effects were diagnosed as stomach cramps from enjoying too many peaches the night before.

Mobley and Mordhorst flew to Edmonton for an exhaustive medical. At 3 a.m., bone weary and surrounded by gowned and masked doctors and nurses, they began to wilt. Would they ever recapture the peace of Warden's Grove? Would anyone feed their dogs? (The military did.)

In the morning they talked to the press. "There's a lot of anxiety among ordinary people," Mobley said. "We're the only two who can say from experience, 'It's not that dangerous.'"

And it was not. Readings at the crater were only 15 roentgens per hour, a level of gamma radioactivity not dangerous to a fleeting touch. Nevertheless, the "hot" core might be out there yet. Mobley and Mordhorst agreed to act as guides for further search around Warden's Grove.

#### A Few Hail Marys

A SMALL airstrip at the Grove served the surrounding Thelon Game Sanctuary. The military planners decided to guard it against enterprising newsmen or

nosy curiosity seekers. By 9 p.m. Sunday, January 29, four hand-picked veterans of the Canadian Airborne were ready for the chanceiest jump of their lives. Four hours earlier, Sgts. John Phillips, Doug Riddell and Chris Cabelguen and Cpl. John Wickstrom had been ordered into Warden's Grove, post-haste. Now, laden with chutes, arctic clothing, rifles, tents, toboggan and dosimeters — small personal radiation detectors — they were being sworn in as special constables. By midnight their Hercules was bound for Yellowknife, then on over the Barrens.

Although tough, cocky John Phillips, the NCO in charge, had 169 jumps to his credit, he was not relishing No. 170. Night jumping can be hazardous any time. At  $-38^{\circ}$  with a strong wind, in wilderness with no medics or hospitals for an injured man, it becomes distinctly unpleasant. But orders were orders. The important thing was to get down in one piece.

At 6 a.m. they crossed the drop zone, south to north, east to west, at 4500 feet, and tossed out six flares in a blaze of 300 million candlepower. They swept lower for a careful look before the flares burned out, and dropped battery-operated lights to mark the near and outer limits.

A strong north wind gusted to 64 km.p.h. — about three times the preferred wind speed for a normal jump. They parachuted their to-

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boggan and watched the wind carry it off target in the predawn blackness.

Inside the Hercules a green light flashed on.

"Go!" yelled the jumpmaster, and Phillips went out the rear end at 1000 feet.

"Go... Go... Go!"

Hard behind him came the others. As he dangled, Phillips saw ominous black shadows below.

"Onigod, rocks!" he groaned, turning into the wind in prescribed fashion to avoid them. He came down skilfully on four feet of snow frozen hard as concrete. Three signal lights blinked on in the dark: the others were safe and, as Riddell wryly remarked later, "saving a few Hail Marys!"

The temperature with wind-chill factor added up to an estimated  $-89^{\circ}$ . They hurried to a deserted cabin. Riddell radioed "all safe." The others fished their stranded toboggan out of a stunted tree. They guarded the area for seven days, but to no avail. Nobody tried to infiltrate Warden's Grove.

MORE hits were steadily showing up. The weather was paralyzing, but the cleanup never stopped.

Tuesday, January 31, was a typical day. A party made up of several U.S. radiation experts, AECB men and NAST specialists flew east of Fort Reliance in a Twin Otter and two helicopters. Working fast in the scanty day-

light, they first picked up a lightweight piece of pipe about two feet long, not radioactive and later analyzed as an alloy of lead, iron, copper, magnesium and manganese.

Moving on, the search party dug up snow around another hit with long-handled shovels. It was a relatively safe 10 to 20 roentgens per hour. Next, they pried up a shiny metal scrap, tied it up inside plastic garbage bags, placed them in a garbage can, taped the lid shut and put it aboard the Otter on a plastic sheet, surrounded by jerrycans of water (an effective radiation shield). At Yellowknife, the garbage can stood overnight under the guard of a hapless RCMP officer. All of this for a three-inch sliver of Russian satellite. Later it went to the Whiteshell Nuclear Research Establishment in Manitoba, where experts tried to assemble a jigsaw puzzle of pieces and learn what the Soviets wouldn't tell them: the exact power source of Kosmos 954.

A day later they brought in the hottest item of the search — a flat metal piece three inches wide, ten inches long and a half-inch thick, emitting 200 roentgens per hour. Two AECB men swathed in protective suits lifted it gingerly with long-handled tongs into a specially built lead container.

"If you carried it around with you for four or five hours, you'd become sick in a week and there



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# KOSMOS 954: THE SPY THAT FELL FROM THE SKY

would be a good chance you'd die," said Dr. Eaton.

There had to be a quicker way of finding these lethal fragments. Garland's two-nation Mission Planning Group brainstormed the problem in its daily meetings, and found an answer: the microwave ranging system.

With each previous day's high-level findings in hand, helicopter teams planted two microwave transmitters in the snow 30 miles apart, embracing each approximate hit site. Then a Hercules with detection gear swept overhead at about 750 feet. The three-way correlation located every fragment dead on, even under a foot of snow. From then on, pickup by helicopter moved swiftly.

## Dangerous Mission

A GHOSTLY, bone-chilling fog shrouded Base Edmonton in the predawn hours of February 11. Rotten weather for flying, agreed Capt. Ted Parnwell and Maj. Amos Scott, waiting outside Hangar Five in their flying suits, peering impatiently into the cotton-wool sky. But they were going to fly and on one of the trickiest peacetime missions.

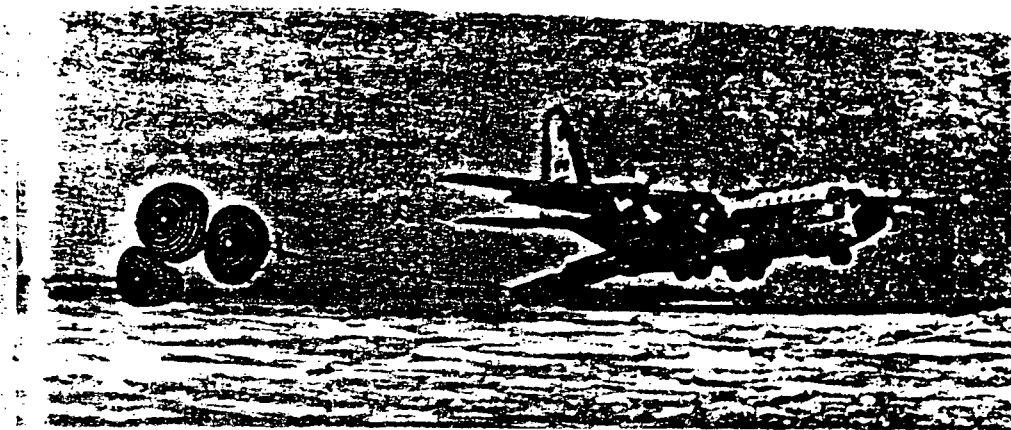
Mission Planning had decided to build a camp near Warden's Grove to save those precious hours of daylight now being used in flying to and from the base camp each day, and to find out for sure if the core was out there or if it

had burned to bits in its fiery skid to earth.

The new "Camp Garland" would have an airstrip, big enough to land a Hercules, on newly named Cosmos Lake. To supply this instant-construction job, they would use a precision technique: Low Altitude Parachute Extraction System (LAPES). LAPES is a way of safely landing anything from light bulbs to bulldozers exactly on target in wilderness, as opposed to the possible damage and inaccuracy of high altitude drops. The biggest danger is to the aircrew: a LAPES aircraft must skim over the target zone four to five feet off the ground and eject the load with a rear-end horizontal parachute pull.

American fliers introduced LAPES in Vietnam. Canadians are currently the only airmen using it on winter operations, for supplying remote northern camps and communities. The all-white landscape makes depth perception difficult — which is rather vital at five feet off the deck. Only the finest pilots and crews fly LAPES. Besides pilots Parnwell and Scott, the crew would include navigator Steve Lucas; W.O. Jim Hill, flight engineer; Sgt. Rick Grinham, loadmaster No. 1, and M.Cpl. Wayne Carriere, loadmaster No. 2.

By 8:45 a.m. visibility had improved, and the Hercules nosed up through clearing fog into brilliant sunlight and out over the frigid north toward the camp site. Almost



LAPES in action: supply pallets shoot out of a Hercules as it skims over Cosmos Lake

two hours later, Parnwell and Scott were circling the drop zone. Wooded bluffs rose up around.

"Look at that chopper!" Scott exclaimed through the headphones. A helicopter was parked where they wanted to drop. They could plant the load further out, but it was a matter of pride to leave it handy for the people below. The pilots discussed the problem with cool good humor.

"Hate like hell to slide the load into the chopper."

"Yeah. They wouldn't like that too much."

They winged in for a low-level dummy run. Yes, they could drop close to shore and avoid the helicopter. It would be a pinpoint drop, but that was their specialty. Time to get ready.

Rear doors yawned open, an enormous picture window framing the frosty landscape. The plane sped in, again and the loadmasters dropped smoke-pot markers over the target zone.

"Six minute check," Parnwell warned over the intercom. In the belly, Grinham and Carriere, wearing crash helmets, headsets and safety harness hitched to the fuselage, checked over the two huge plywood cartons containing 64 barrels of aviation fuel, mounted sled-fashion on aluminum platforms. In a final walk-down, they checked locks and unfastened safety lines. The thrumming Hercules eased down to just under 150 m.p.h. ground speed.

"One minute!"

The loadmasters released a safety line on the drogue parachute that would trigger the ejection.

"Thirty seconds!"

The Hercules leveled, speeding into the drop zone, wheels down. The ground outside, a white blur with fleeting smudges of bush, was ... right there.

"Fifteen seconds!" Then ...

"Deploy the drogue!"

A 15-foot parachute snapped out behind, a sudden drag on the

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big plane. But Parnwell held the nose steady with a sensitive hand.

"Green Go!" cried Scott and pressed a pistol-grip button in the cockpit. At the same instant Grinham yanked a manual release handle in the belly, as a double-safety measure.

*Crack!* Three 28-foot parachutes blossomed behind. Two seconds later - *Whoom!* - 16 tons of load shot out like a cannonball and landed smoothly in a geyser of snow.

"Load clear," Grinham called.

For a millisecond, the aircraft, relieved of its weight, shuddered and tried to nose down. In that same split second Parnwell pulled it into a steep climb with maximum power. A minute later the Hercules made a lazy arc over the drop zone. Far below, the load lay neatly parked a few dozen feet from shore. The helicopter was intact.

"They won't have to walk far for that one," Scott said casually. At 10:55 a.m. the Hercules turned for home.

#### The Legacy of 954

WITHIN two weeks Cosmos Lake was a thriving tent community of 54 people. Low-level microwave ranging sweeps were finding a multitude of radioactive particles, no bigger than buckshot, not dangerous unless swallowed but considerably hotter for their size than earlier hits. Were they part of the shattered core? Perhaps.

No large piece of core was found. On March 30, Camp Garland closed. In April, Operation Morning Light ended, after 4773 flying hours. All communities, 40 fishing lodges, all travelways and a whooping crane nesting area had been searched and pronounced clean. American assistance had been invaluable; in turn, Troy Wade, deputy head of the U.S. contingent deemed the Canadian team "as good as any in the world." But Environment Canada, and private consultants working under the AECB, continued to monitor the area into the summer.

"We probably removed all the really hazardous stuff, but it's rather like a game of chance," explained the AECB's Geoffrey Knight. "There's a slight but real possibility we missed something. But there's very little possibility of anyone happening on to it in that vast space, or being in contact long enough for it to do them harm."

Nor was any radioactive cloud detected in the glut of radioactivity already in the upper atmosphere. So now the matter of Kosmos 954 clanked through the ponderous machinery of diplomacy.

Canada expected to be paid for damages, including search costs of several million dollars, as required by international agreement. Diplomatic notes flowed between Ottawa and Moscow. Yevgeniy Fedorov of the Soviet Academy of Sciences delivered a speech to

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a United Nations subcommittee, expressing no enthusiasm for a ban on nuclear-fueled satellites, but acknowledging that if a satellite "should cause damage to another state, then the launching state is duty-bound to compensate for this damage."

Throughout, Canada deliberately maintained a calm official demeanor, hoping to win Russian coöperation (which turned out to be minimal) and to keep communication lines open, should such an accident happen again. But at the very least, Canada wants a greater exchange of information in any future emergency.

There are other nagging questions. It is believed that Kosmos 954 did not operate long enough to produce much of the deadly plutonium 239. But suppose other nuclear reactor satellites *do*? Even if they remained in high orbit for 1000 years, they would still be highly toxic should they return to earth. Has anyone the moral right

to inflict such poisons on future generations?

Much more pertinent to the world of today: neither East nor West shows signs of abandoning outer space spying, and the Soviets seem unlikely to give up nuclear reactors aloft. Inevitably, then, given the fallibility of men and machines, another will fall sometime. What if it falls on a city?

Geoffrey Knight is one official who refuses to sidestep that question. "It could have been a very serious problem in a populated area," he says. "If the core had come down unburned it would have been lethal. We would have had to consider contamination of water and food supply. Evacuation of people, perhaps. Restriction of their movements. All those rather horrifying thoughts."

And those horrifying thoughts - far more than the dollar costs, the derring-do, the painstaking and risky search - are the *real* legacies of Kosmos 954.

## Precarious Canadian emergency plans

Sirs: — Jim Robb's article (Journal, July 22) about the part played by the armed forces in dealing with the emergency caused by the disintegration of the Russian Cosmos satellite raises some pretty serious questions about Canada's emergency plans.

The October 1972 Report of the Crisis Management Study Group — The Enhancement of Crisis Handling Capability Within the Federal Structure — was supposed to have recommended ways in which future disasters or emergencies could be tackled in much more rational way than they had been in the past.

Little has been forthcoming about the part which should have been played by other agencies and departments. The territorial government in whose territory the emergency took place has legislation to deal with emergencies, and is supposed to have a program to deal with such events, yet nothing has been told of their part.

The Department of Indian and Northern Affairs which had claimed to be responsible for handling all peacetime emergencies north of 60 seems to have been missed in all the press reports dealing with that emergency.

The CBC which is supposed to have some role in emergencies did little or nothing to inform the populace of the territory what was taking place in their backyard.

And Emergency Planning Canada, reincarnated from the remnants of the old-fashioned EMO, is supposed to do something about emergencies. Yet from what I can gather it was not even invited to participate during the early stages of the emergency.

Why did Canada have to rely so completely on the United States for radiation detection equipment? If DND had not let its wartime responsibility for radiological defence drift into a program of nothingness, its con-

tribution might have been even more effective.

And of course there is the Emergency Planning Secretariat in the Privy Council Office. Considering the roadblocks it has thrown in the way of emergency preparations during the past five years, it was probably a good thing that their participation was minimal.

Far from enhancing the capability of the federal structure, the reorganization of emergency planning five years ago finds Canada in a far worse and more precarious position for dealing with wartime or peacetime emergencies. It is quite apparent that Trudeau's government, and some of its more senior bureaucrats, just do not believe in the need to have a capable emergency oriented organization.

29 1978  
JOHN F. WALLACE  
Ottawa.  
JOURNAL  
OTTAWA, ONT.

## Anti-hijacking plans to be laid in Bonn

GAZETTE 22 31 1978  
WASHINGTON — The seven western industrial powers whose airlines carry most of the world's air passengers, this week will set in motion a mechanism to deal with aircraft hijacking. The State Department announced the seven western industrial powers who met for the Bonn summit earlier this month, will meet again tomorrow and Tuesday in the West German capital to work out of the details of the anti-hijacking agreement reached at that economic conference.

President Jimmy Carter and the leaders of Germany, France, Great Britain, Canada, Italy and Japan attended the Bonn economic summit, where they called for joint efforts to combat international terrorism as it affects aviation.

Specifically, they agreed to cut commercial air service to countries that refuse to extradite or prosecute hijackers, or refuse to return hijacked airplanes.

The meeting was called by the West German government, host of the economic summit, "to develop specific procedures under the initiatives of the Bonn declaration to deter air hijackings."

Ambassador Anthony Quainton, head of the State Department's office for combatting terrorism, said the meeting will try to clarify the procedures to be used to deal with future hijackings.

He said the Bonn agreement addresses only the hijacking aspect of international terrorism.

## West Germany asks U.S. to extradite terror suspect

GAZETTE 22 31 1978  
BURLINGTON, QUE. — The West German government has asked the United States to extradite alleged terrorist Kristina Berster to face charges in West Germany, U.S. federal officials said on the weekend. They refused to discuss the nature of the charges.

Officials also said the U.S. government must release Berster if she is not placed on trial within 60 days for alleged immigration law violations.

Berster, 27, is scheduled to appear in a U.S. District Court tomorrow on seven charges that she violated immigration laws by trying to slip into Vermont from Quebec with a phony passport. She is being held in Albany, N.Y. on \$500,000 bail.

Her lawyer, William Kunstler of New York, said he will ask the court to reduce her \$500,000 bail and will make "other motions."

Authorities say Berster is wanted in West Germany for activities linked with a radical group in Heidelberg, considered a recruiting ground for the Baader-Meinhoff urban-guerrilla gang.

They say she went underground after being released from jail in 1973 without standing trial and is now on West Germany's most-wanted list.

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78-08-11

Call placed to Dr. Gummer AECB  
(5-5909)

RE: 36 RADIATION DOSIMETERS TO BE  
PROVIDED TO DETS. IN NORTH FOR DISTRIBUTION  
TO NATIVES.

QUESTION WHERE ARE THEY NOW?

WHO WILL SHIP & WHEN?

WHO WILL RECEIVE? - OUR  
HQ at YELLOWKNIFE OR  
THEIR REP. AT HAY RIVER?

~~THEN ADVISE C.O. YELLOWKNIFE OF  
SCORE.~~

INSP. JENKIN : - GUMMER PHONED TO ADVISE  
THAT DOSIMETERS HAVE ALREADY BEEN  
SHIPPED

C.O. "G" Division,  
Yellowknife, N.W.T.

HQ-485-35

OIC Security Policy Section  
'P' Directorate - Ottawa

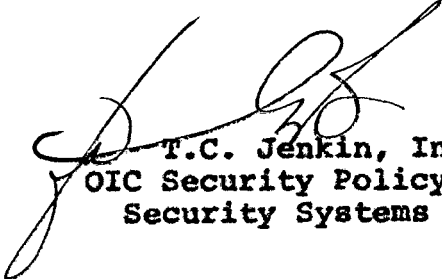
78-08-11

Radiation Dosimeters

Attached is a copy of correspondence from A.E.C.B. dated 78-08-02 regarding the control of dosimeters loaned to inhabitants of the Great Slave Lake district, together with instructions as to the use of the equipment.

2. It is our understanding that the dosimeters have already been shipped to Hay River and that you were previously advised.

Att.

  
T.C. Jenkin, Insp.,  
OIC Security Policy Section,  
Security Systems Branch

GTB/vmh

cc: File HQ-485-35  
Letterbook

PA  
J P 8/2  
78.09.28.  

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Atomic Energy  
Control Board

Commission de contrôle  
de l'énergie atomique

PLANNING AND ADMINISTRATION  
DIVISION

Your file    Votre référence

Our file    Notre référence

15-200-24-0-0

August 2, 1978

Inspector Terry C. Jenkin  
Security Police Section  
Royal Canadian Mounted Police  
720 Belfast Road  
Ottawa, Ontario  
K1A OR2

Dear Mr. Jenkin:

This will confirm our telephone conversation yesterday concerning provision of radiation dosimeters to inhabitants of the Great Slave Lake district.

- 
1. After reconsideration of the matter, officials of the Department of Indian and Northern Affairs have agreed that personal dosimeters may be made available, under some control, to residents in the Cosmos 954 "fallout" area. Attached is a copy of a letter stating this; I was advised that the letter was signed on 17 July, 1978.
  2. The AECSB will maintain a "coordinator" in Hay River during the summer "Phase 2" clean-up operations. The present coordinator, Mr. F.C. Boyd, has been in touch with the Hay River RCMP detachment and reports that no problem is foreseen in handling the dosimeters.
  3. RCMP and Mr. Boyd do emphasize, however, that there may be little need to send dosimeters to the six detachments that have previously been discussed. In their opinion, the most sensible place to have a supply of dosimeters is Snowdrift. This is because the natives from there travel in the Artillery Lake area and eastward. The local Chief

.../2

P.O. Box 1046  
Ottawa, Canada  
K1P 5S9

C.P. 1046  
Ottawa, Canada  
K1P 5S9

Inspector Terry C. Jenkin  
August 2, 1978

Page 2

has been asking for dosimeters. I suggest that we can leave it to your people in the area, and to Mr. Boyd or his successors (on roughly a monthly rotation) to decide exactly how to lend out dosimeters from the stock of 36 that I understand are available. They have a better feel for the needs and wishes of local populations than we have, and should have some flexibility to meet these needs.

4. We request that RCMP officers distribute dosimeters in a controlled fashion, i.e. first make some sensible decision as to need for dosimeter based on area of travel and on reliability of person requesting an instrument; keep a record of who receives one and what report he makes, if any; and instruct recipients on life of the batteries and that the instrument is the property of the AECB. Also attached is a brief introduction to the Victoreen dosimeter, and a set of directions for their loan and return. I will send a number of copies of this to our coordinator for use in Hay River and elsewhere as appropriate.

Mr. Boyd will be returning to Ottawa towards the end of this week, and is being replaced by Mr. M.C. White for the month of August.

I hope that the above is satisfactory to you.

Yours truly,



W.K. Gummer  
Manager, Planning and  
Coordination Division

Encls.

cc: Mr. John Fowler  
Chief, Audio Visual and  
Exhibits Planning  
Public Communications and  
Parliamentary Relations Board  
Department of Indian and Northern  
Affairs

Assistant Deputy Minister  
Indian and Northern Affairs

Northern Affairs

Sous-ministre adjoint  
Affaires indiennes et du Nord

Affaires du Nord

No.	15-200-24-00
Refer	
To	X. Cameron

Mr. A. Kroeger  
Deputy Minister

Your file    Votre référence

Our file    Notre référence

DISTRIBUTION OF POCKET DOSIMETERS TO NORTHERN RESIDENTS

From the beginning of the Cosmos satellite clean-up consideration has been given to making pocket dosimeters available to northern residents to enable them to identify radioactive materials encountered during travel in the bush.

On the basis of information from Atomic Energy Control Board and Health and Welfare Canada we have resisted this as likely to be of little need or value and possibly productive of unwarranted alarm on the part of northerners and unwarranted sensationalized media coverage.

Some time ago an AECEB official, while visiting the North, inadvertently made a public statement that these detection units would be available to meet requests, and there has been public demand recently that cannot be denied without possible misunderstanding.

Accordingly, we have agreed to have AECEB distribute these units, through the RCMP, on a controlled basis which will serve further to reassure northerners. A total of 36 units will be made available from six RCMP detachments to responsible citizens for use in areas that have not already been searched.

Our department will not be involved in the distribution or public awareness activities with regard to these dosimeters. AECEB will make all necessary arrangements. All calls from the media will be referred to them but officials will acknowledge our awareness and support of AECEB's efforts.

A.E. Belcourt/cl  
July 10, 1978

Ewan Cotterill.

c.c. John Hoyt  
Phil Gibson  
Dr. W.K. Gummer, AECEB

400 Laurier Ave. West  
Ottawa, Ontario  
K1A 0H4

400, av. Laurier ouest  
Ottawa (Ontario)  
K1A 0H4

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## PERSONAL DOSIMETERS

### Description of dosimeter

The Victoreen Model 885 "VIP" Pocket Dosimeter is designed to record the gamma radiation exposure and to give an audible signal at a rate that depends upon the intensity of the radiation.

Pictures of the front and back views of the dosimeter in Figure 1 show the main features that are explained briefly below.

### ON-OFF Switch

The instrument must be switched ON in order to work. The ON-OFF switch is protected by two tabs to prevent accidental operation of the switch - it may be necessary to use some sort of narrow tool to operate the switch.

### "Press to read" button

When the instrument is "ON", pressing this button will light the exposure display and the battery charge light.

### Battery charge light

The light comes on when the instrument is "ON" and the "press to read" button is pushed. This light indicates that the battery is sufficiently charged.

### Exposure Display

Three numbers in the display window show the exposure received in 1 milliroentgen (usually shortened to mR) steps up to 999 mR; for example:

a 2 mR exposure would be displayed as 002

a 17 mR exposure would be displayed as 017

000000

- 2 -

### Speaker (audible signal)

The dosimeter produces an audible signal or "beep" when switched ON. The signal is given at a rate of 40 "beeps" per mR; this means that for an exposure rate of, say, 3 mR per hour, a "beep" will be heard every 30 seconds. The natural radiation rate is much lower than this and is usually about 10 microroentgens per hour; at this low rate, the "beeps" will be heard every 2½ hours and it will take about 4 days before the exposure display changes by 1 mR.

### Batteries

The dosimeter uses a 9-volt transistor battery (an alkaline battery is preferred for better performance) which lasts for 30 days with the dosimeter switched "ON" all the time.

### Changing batteries

The battery must be changed if the battery charge light does not light when the "press to read" button is pushed. A fresh battery should also be connected when the dosimeter is first issued to somebody.

The steps for changing a battery are simple and you may find the attached pictures in Figure 2 helpful.

1. Note the number shown in the exposure display and then switch the instrument OFF.
2. Remove the 4 screws that secure the cover.
3. Remove the cover, but be careful not to damage the wires connected to the speaker.
4. DO NOT TOUCH THE RADIATION DETECTOR. It may have an electric charge on it and will give you a shock.

..,000000

- 3 -

5. Carefully lift out the old battery and disconnect the battery connectors.
6. Attach the connectors to a fresh battery. The connectors are designed so that you cannot properly connect the battery in the wrong polarity - do not force the connection; if you have difficulty try reversing the connectors.
7. Replace the freshly connected battery in the dosimeter case.
8. Replace the cover.
9. Fasten the 4 screws to secure the cover.
10. Switch the instrument "ON" and check that it "beeps" once.
11. Push the "press-to-read" button and check that three zeroes appear in the exposure display window and the battery charge light comes on.
12. If the dosimeter is to be used right away, leave the switch "ON" otherwise switch it "OFF" to save the battery until it is needed.

- 4 -

Action required when issuing dosimeters:

1. Determine that the proposed trip is in an area where sources may be found, and that there is a bona fide need for a dosimeter.
2. Ask the individual to identify himself/herself.
3. Record name, address, phone number (if appropriate) and have individual sign for dosimeter.
4. Provide simple written instructions on how to use dosimeter and where to return it.
5. Ensure that dosimeter has a fresh battery and is working. (Follow the instructions given under "changing batteries".)

- 5 -

Action required by the user:

1. When you go on your trip, take a piece of paper and a pencil with you to keep any notes that become necessary.
2. At the start of your trip, note the date and the names and addresses of all the members of your party. Switch the dosimeter "ON" and check that it "beeps" once, then push the "press-to-read" button and check that three zeroes appear in the exposure display window and the battery charge light comes on. Leave the dosimeter switched "ON" at all times until the end of your trip; the only exception is if it becomes necessary to change the battery during a long trip (more than 4 weeks). Carry the dosimeter in a pocket where you can hear the "beeps".
3. When you complete the different stages of your trip, make a note of the number shown in the exposure display, as in the following example:

July 12	Started trip. Switched "ON"	000 mR
July 13	Camped at Fish Lake	000 mR
July 14	Camped at Bear Creek	000 mR
July 15-17	Camped at Trout Lake	001 mR
July 18-20	Camped at Rock Point	002 mR
July 21	Camped at Buffalo Rapids	002 mR
July 22	Camped at Pine Bluffs	002 mR
July 23	Returned home. End of trip.	003 mR

..000000

- 6 -

4. The "beep" rate will probably be about once every  $2\frac{1}{2}$  hours during your whole trip, but if it changes significantly, then you should follow the recommended action given below:

Approximate "Beep" period

Every  $2\frac{1}{2}$  hours to every  $\frac{1}{2}$  hour.

Every 15 minutes to every minute.

More than one per minute.

Recommended action

Probably due to the natural background - no particular action recommended.

Might be a small piece of the satellite nearby, but might be a natural 'hot spot'.

Make a note of the location and do not plan to spend more than 1 day at this spot.

Good chance that there is a piece of the satellite nearby.

Do not remain in this spot and make a note of the location.

5. When you complete your trip, return the dosimeter and your notes to your local RCMP Detachment. Report anything unusual that happened including any difficulties you may have had with the dosimeter or these instructions.

../7

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- 7 -

Action required by issuing officer upon return:

1. Record name and address of all members of group (if appropriate), or confirm that person who signed for dosimeter also carried it.
2. Record dose on digital display, period (dates) of trip, route taken, location of any abnormal activity or any unusual observations.
3. Notify AECB Co-ordinator in Hay River of any abnormal activity or unusual observations.

Phone number (403) 874-3505.

2 August 1978

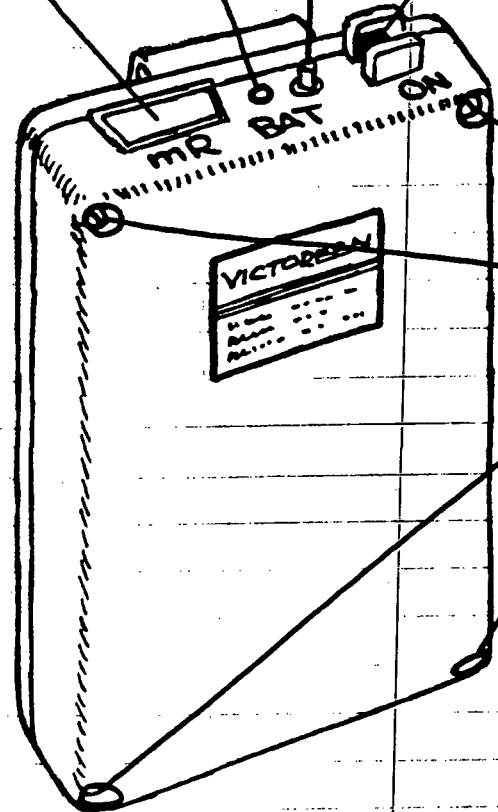
BATTERY CHARGE LIGHT

"PRESS TO READ" BUTTON

EXPOSURE DISPLAY

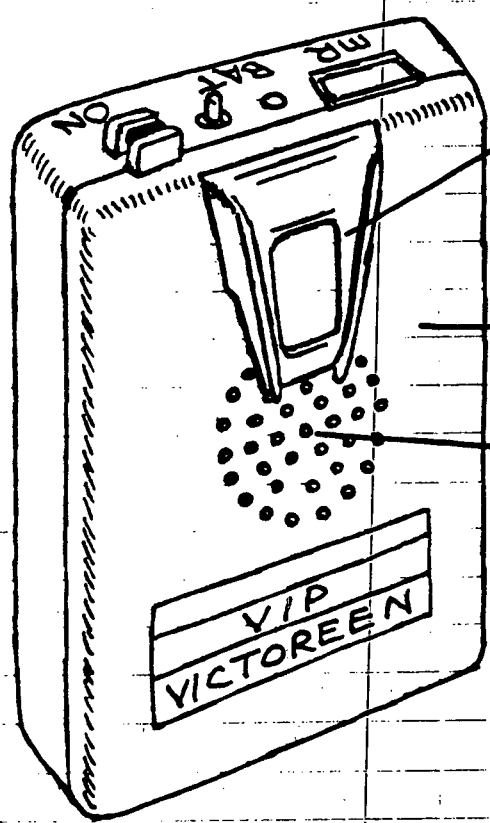
ON-OFF SWITCH

FRONT  
VIEW



4 SCREWS  
TO SECURE  
COVER

BACK  
VIEW



CLIP

COVER

SPEAKER

FIGURE 1.




MEMO TO FILE

78-08-01

File HQ-485-35

At 08:30 Dr. Gummer, A.E.C.B., called stating that Indian Affairs had had a change of heart and now felt that dosimeters could be loaned to individual responsible citizens. The A.E.C.B. Co-ordinator in Hay River has stated that in his estimation Snowdrift is the logical place to locate these instruments. I am not sure if we have a detachment in that location, but we will determine that later on.

Dr. Gummer stated that the R.C.M.P. now have six (6) dosimeters at Hay River, and his department would be supplying a further thirty (30) shortly. All this information will be confirmed by letter.



T.C. Jenkin, Insp.,  
OIC Security Policy Section,  
Security Systems Branch

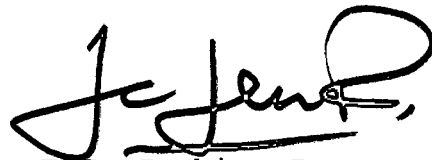
MEMO TO FILE

78-07-13

File HQ-485-35

At approximately 15:00 I contacted Dr. Gummer, A.E.C.B., and asked if any decision had been made regarding the dosimeters and the use thereof by our detachments in the Northwest Territories. Dr. Gummer said that he had been working on this project with Indian Affairs and would be in a position to advise us next week.

Dr. Gummer mentioned that he now realized that due to the publicity and concern indicated by the residents of the Northwest Territories over the satellite and related fallout of radioactive material, we would have to adopt the position of supplying these instruments to local responsible citizens. We then discussed RCMP responsibility for such equipment and we clarified that the Force would be responsible insofar as it relates to loaning the equipment to responsible persons, but we could not be held accountable once it was in their hands.

A handwritten signature in black ink, appearing to read 'T.C. Jenkin', with a stylized flourish at the end.

T.C. Jenkin, Insp.,  
OIC Security Policy Section,  
Security Systems Branch



Atomic Energy  
Control Board

Commission de contrôle  
de l'énergie atomique

News  
Release

Communiqué

NEWS RELEASE 78-5

FOR IMMEDIATE RELEASE

July 6, 1978

PROGRAM MANAGER SELECTED FOR SOVIET SATELLITE DEBRIS SEARCH

OTTAWA --- The Atomic Energy Control Board (AECB) announced today that a contract for up to \$847,000 has been awarded to the engineering consulting firm of James F. MacLaren Ltd. to conduct the second phase of the Cosmos 954 satellite search and recovery operation. A liaison office will be established by the AECB in Hay River, N.W.T., for the duration of the second phase work.

Purpose of the ongoing investigation is to establish that the extensive operations conducted during the winter months were successful in recovering all potentially hazardous radioactive material. As well, the search area will be expanded into northern Alberta and Saskatchewan where a few small radioactive particles have been found by uranium prospectors.

Acting as program manager, James F. MacLaren Ltd. will conduct aerial and ground searches in inhabited areas, other areas likely to be frequented by people, and on transportation routes. All recovered debris will be sent to the Whiteshell Nuclear Research Establishment, Pinawa, Man.

The AECB is confident that all large fragments of the satellite were recovered, at least those that had any significant radioactivity associated with them.

James F. MacLaren Ltd. is also the AECB's program manager for radioactivity investigation and remedial programs in the Ontario communities of Port Hope and Bancroft.

- 30 -

Contact: Hugh J. M. Spence, Chief, Office of Public Information, AECB  
Ottawa (613) 995-5894

PA  
78-07-10  
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RECORDS MANAGEMENT - C.I.B. CLASSIFICATION AND CHECK SHEET  
GESTION DES DOSSIERS - FEUILLE DE CLASSEMENT ET DE CONTRÔLE DU SEJ

C.B.

CLASSIFIER		CLASSIFICATEUR
INITIALS - INITIALES	DATE	
<i>Ym</i>	26-9-78	
FILE No - N° DU DOSSIER		
HQ-485-35		

NAME - NOM

OPERATION MORAIN G.L.I.G.H.T

(VOL. 2)

ADDRESSES - ADRESSES

DATE AND PLACE OF BIRTH - DATE ET LIEU DE NAISSANCE

F.P.S.

CHECKED - VÉRIFIÉ

INITIALS - INITIALES

DATE

FILE REFERENCES - DOSSIERS À CONSULTER

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# ***sentinel***

1978/2

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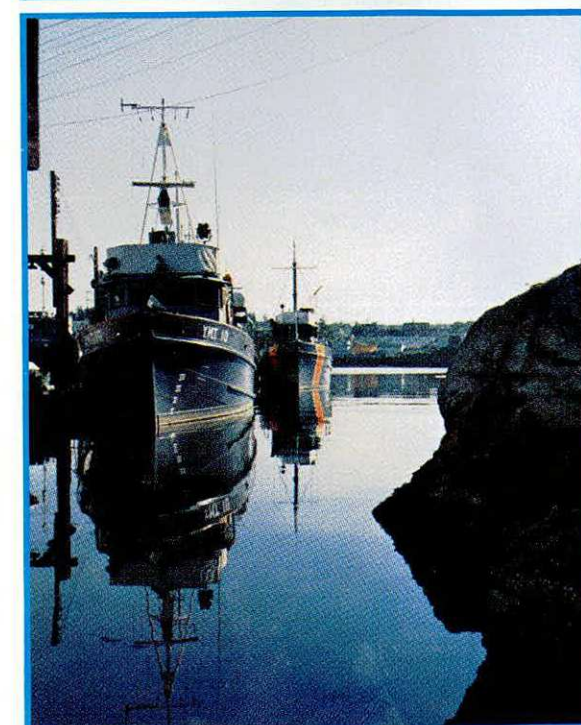
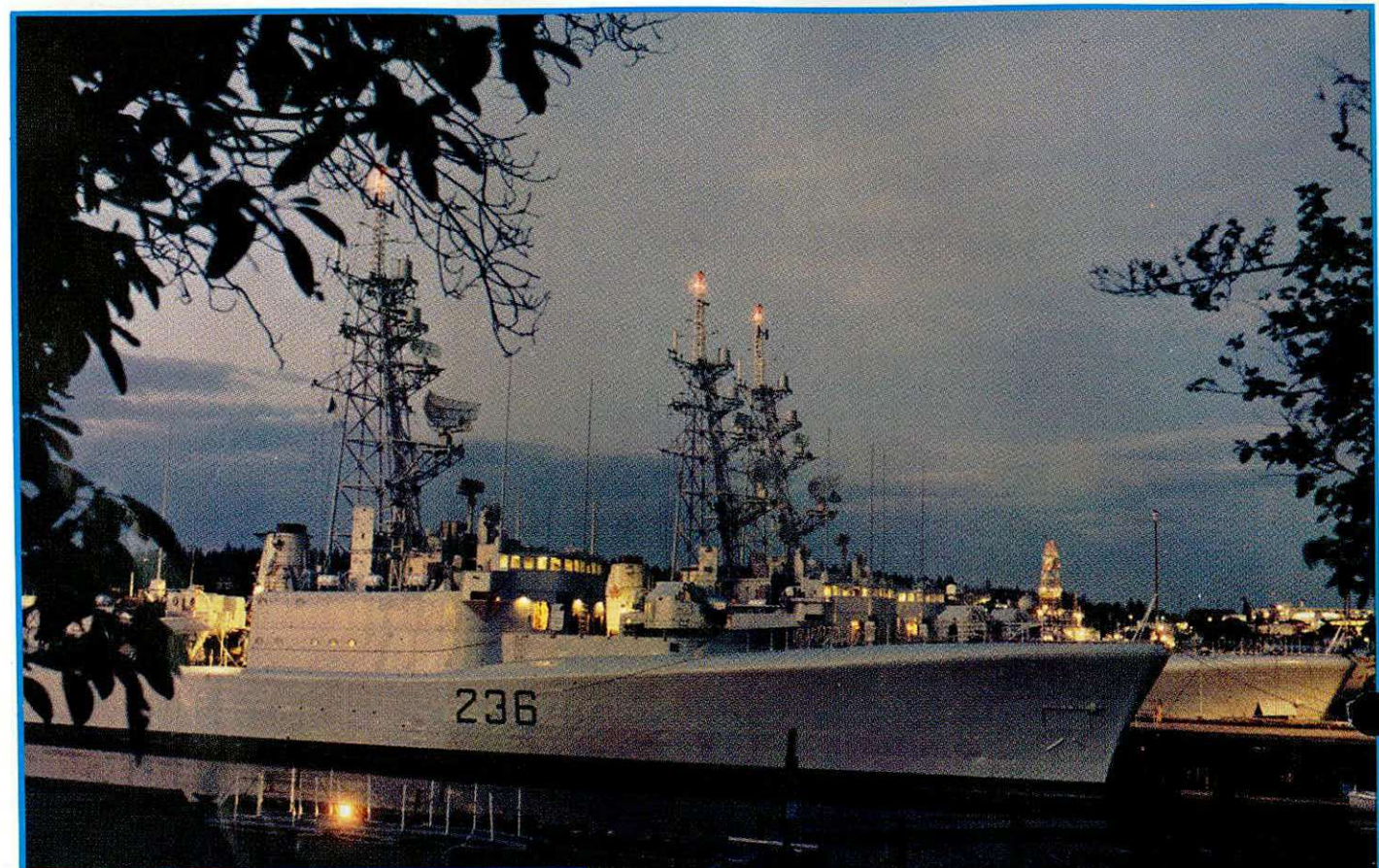
78-07-10  
p8/2  
J copies & 'G' Div.



OPERATION  
**MORNING LIGHT** page 4



# Alongside in Esquimalt



The tranquility that gave the Pacific Ocean its beautiful name had descended over Esquimalt harbour when these photos were taken. M/Cpl Andy Cabouche made an evening visit to record HMCS Gatineau alight and alongside. (REC 76-234) Sgt Andy Leduc captured the same calm beauty in a daytime photo of YMT 10 and a smaller harbour vessel at rest. (IXC 77-195) M/Cpl Cabouche and Sgt Leduc are CF photographers.

**sentinel**  
1978/2  
magazine of the Canadian Forces

Volume 14, Number 2  
ISSN 0037-2315

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Sentinel Managing Editor Maj. Bill Aikman observes readings on a Hercules-mounted gamma ray spectrometer during a search mission over Warden's Grove. (Dave Jackson photo)

## OPERATION MORNING LIGHT

When Cosmos 954 plunged to earth in the Northwest Territories in late January, the eyes of the world focused on Canada's North and the Canadian Forces.

Within hours, CFB Edmonton was transformed into a huge search centre, crammed with scientists and their exotic equipment. During the next few weeks, aircraft roared off at all hours on their Arctic search missions.

In the months following those frigid January days, Canadian Forces personnel, scientists, and technicians from both Canada and the United States worked together on an operation for which there were no precedents.

Sentinel spent 17 days on Operation Morning Light, following the search team from Edmonton to Yellowknife and Baker Lake, and finally to Camp Garland near Warden's Grove. We found it a rewarding experience to observe Canadian-American professionalism and cooperation working under most demanding conditions.

Our challenge then was to capture the essence of this complex operation in a magazine article. Inevitably there are a large number of people whose efforts deserve a place in the story, but who through lack of space simply could not be included.

Many of the photographs in the magazine are credited to "E.G.&G. photo team." These were taken by photographers from the American Nuclear Emergency Search Team. For their excellent coverage of many key incidents in the search and their generosity in providing us with the photos, we extend our sincere appreciation.

We hope that this Sentinel article will give our readers an insight into the biggest CF operation since the 1976 Olympics.

W.R.A.

Cover. Bundled up to protect themselves against the Arctic cold (with wind chill factors below -100°C), scientists and CF Nuclear Accident Support Team members trudge across the ice of Great Slave Lake, looking for debris from satellite Cosmos 954. (EG&G photo 1503-26)

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# OPERATION MORNING LIGHT

by Major Bill Aikman

At 4:40 a.m. on January 24, at NORAD's Space Defence Centre deep inside Cheyenne Mountain, Colorado, Captain David Tholen, Chief Orbital Analyst receives a message from a telescopic camera station at Maui, Hawaii. The trackers there report that a Russian satellite on a trajectory towards Canada's Queen Charlotte Islands is glowing with heat and is beginning a fiery re-entry into the earth's atmosphere.

Capt. Tholen reaches for his emergency phone to notify his NORAD superiors.

Fifteen minutes later, a patrol car

normally within weeks. Soon NORAD's computers were predicting that the satellite would fall in April, 1978.

However, in early January the computer predictions were revised to January 23, plus or minus 48 hours. During this critical period, Cosmos 954 would orbit the earth several times, and would overfly Australia, New Zealand and North America. On January 19, the American government notified all nations potentially involved of the developing danger, and offered American assistance.

The next day, senior Canadian gov-

Carter of the United States telephoned Prime Minister Trudeau to advise him of the situation, and to repeat the offer of American assistance.

The Canadian government was now faced with several urgent questions. Had the intensely radioactive core disintegrated while re-entering the earth's atmosphere? Or had it crashed, with its potentially lethal fragments radiating from the depths of the all-encompassing snow? Or had both occurred?

## OPERATIONS BEGIN

President Carter's offer was accepted. Soon the wires between the two capitals were humming as commanders made their initial contacts and plans.

Operation Morning Light, the search for the radioactive elements of Cosmos 954, had begun.

Operational responsibility was assigned to the Commander of Air Command, Lieutenant-General William Carr. He in turn assigned on-scene command to the Base Commander of CFB Edmonton, Colonel David Garland.

The first search efforts were directed towards identifying major radiation

Clockwise from above. A scientist checks snow around a hit site for possible further radiation sources (ISC 78-1073). Hercules crew member straps down cask containing satellite debris. (IS 78-1094) Part of the operations centre at CFB Edmonton. (EG&G photo 1561-9). American helicopter containing radiation detection equipment is pushed aboard CF Hercules preparation for first search mission. (EG&G photo). Discovery of satellite remains on Great Slave Lake. (IEC 78-108). Centre. NAST members at Yellowknife handle contaminated material. (IEC 78-252). Right. Debris found on Thelon River. (EG&G photo 1495-3).

carrying two RCMP constables along the darkened wintry streets of Yellowknife, N.W.T. skids to a halt. They stare in amazement as a bright red, incandescent object streaks in a northeasterly direction across the black sky. As it plunges towards the earth, dozens of little pieces break off and tumble over and over on their way to the ground. The constables immediately radio their headquarters.

Cosmos 954, a nuclear-powered Russian satellite, has disintegrated and fallen to earth in Canada's Northwest Territories.

The plunge to earth of this maritime surveillance satellite was not unexpected. Launched on September 18, 1977, the Russian satellite began behaving ab-

normal and military personnel discussed the situation. After the meetings, National Defence Headquarters sent warning orders to all regional commanders and Nuclear Accident Support Teams (NAST) at bases across Canada.

The conferences continued for several days. Still no one could be certain of where the satellite would re-enter the earth's atmosphere.

DND was assigned the lead role in the potential search for the radioactive debris, and the Atomic Energy Control Board (AECB) was assigned responsibility for the recovery of any debris.

Then came the fiery re-entry of Cosmos 954 somewhere over the Northwest Territories.

Fourteen minutes later, President

sources, particularly in inhabited areas. NORAD's calculations indicated that the satellite, after a fifteen minute re-entry through the earth's atmosphere, had crashed somewhere between Yellowknife on Great Slave Lake and Baker Lake, 800 km to the northeast. This was in a sense fortunate, for the land between the two points consists of the Barrenlands; for the most part a treeless, uninhabited area.

South of the computed track on Great Slave Lake lay the communities of Fort Reliance, Snowdrift, Hay River and Pine Point.

Col. Garland immediately dispatched 25 members of the CFB Edmonton NAST team to Yellowknife, 1,000 km farther north by air. They were to check





Above. NAST members in their full kit. Below. The first American C-141 lands at CFB Edmonton.



The American commander, Brig-Gen (ret'd) Mahlon Gates and the Canadian commander, Col. David Garland, discuss search operations. (EG&G photo 1561-41)



the city (population 10,000) and the other smaller communities for radiation.

Under the command of Capt John Lyne, the NAST team departed shortly after noon for Yellowknife, and arrived in time to carry out a detailed survey of the town that evening. The normally easy-going citizens of Yellowknife were startled by the sight of yellow-garbed troops walking the streets, reading radiation meters and taking air samples. Tension dropped when negative results were announced.

By noon that day, American search activity had begun. One U-2 and one KC-135 jet aircraft with special radiation monitoring equipment aboard were winging their way north to check the upper atmosphere along the satellite's path, to ascertain whether or not a radioactive cloud had been created by the disintegration of the nuclear reactor and its Uranium 235 core. The results were negative.

The first search efforts had provided no hint as to what had happened to Cosmos 954.

#### SEARCH FORCE ORGANIZES

Meanwhile, back at Edmonton, the entire base prepared itself for the onslaught of technicians and scientists, both Canadian and American, and for extended search operations. The Morning Light Operations Centre was set up, and supply technicians, transport drivers, cooks and telephone operators readied themselves and their equipment for days or weeks of round the clock operations. At the same time aircrew, groundcrew and maintenance personnel for 435 Squadron's *Hercules*, 408 Sqn's *Twin Hueys* and *Kiowas*, 440 Sqn's *Twin Otters* and 450 Sqn's *Chinooks* went on standby for search operations.

Far to the south the Americans were mobilizing their search effort. Several years ago, the U.S. Department of Energy (DOE) organized Nuclear Emergency Search Teams (NEST) to search for and locate lost or stolen radioactive materials. The NEST expertise proved to be tailor-made for the Cosmos 954 search.

The NEST system is based at DOE's Las Vegas, Nevada operations office (the same office that runs the Nevada nuclear test site). Under the direction of Brig-Gen (ret'd) Mahlon Gates, the NEST organization had been preparing itself for the plunge of Cosmos 954 for several weeks. Team members had been detailed, equipment had been selected and loaded on pallets, and by January 22 five fully-loaded C-141 *Starlifters* were sitting on the ramps at McCarren Inter-

national Airport near Las Vegas, at Andrews A.F.B., Washington, D.C. and at Travis A.F.B., Cal., all ready to go.

Since there was no reliable information on where the satellite would land, many of the scientists had two bags packed; one with summer clothing, the other with winter clothing.

By mid-morning of January 24, arrangements between Canada and the U.S. were falling into place. It was agreed that the NEST organization would operate out of Edmonton under the direction of Col Garland. Two C-141's lifted off from McCarren and Andrews just after noon with over 70 Americans aboard, and by suppertime were touching down at Edmonton's Namao Airport.

At almost the same time, Dr. Bob Grasty of the Geological Survey of Canada arrived at Edmonton from Ottawa. Dr. Grasty, a specialist in aerial survey for radioactive materials, was the first of approximately 30 Canadian scientists and technicians from the Atomic Energy Control Board (AECB); Energy, Mines and Resources (EMR) and Environment Canada who would work with the CF and the Americans in the search and recovery organization.

That night the Americans moved their equipment into a hangar at Namao, picked up CF winter clothing, and met with the Canadians to work out the plans of operation.

One of the first points resolved was the search area. Using computer re-entry predictions, the scientists plotted a 50 km wide zone starting at a point on Great Slave Lake 80 km southeast of Yellowknife and running 800 km northeast towards Baker Lake. The potential "hit" area was huge, approximately 40,000 sq km. For planning purposes it was divided into eight equal sectors.

#### HERCULES SEARCH

Search procedures were also clarified. First, there would be a general search of the area, using the C-130 *Hercules* of CFB Edmonton's 435 Transport Squadron. Each *Hercules* would carry gamma ray spectrometer, a device designed to determine the amount of radiation emitted from a ground source. Each aircraft would fly a grid pattern 1,000 ft over the suspected satellite crash area, with the lines of the grid one nautical mile apart. If the equipment detected a hit (the search teams' term for a suspicious reading on the spectrometer), the location would be noted for detailed checking later by helicopter-borne recovery teams.

One Canadian gamma ray spectrometer (designed for uranium exploration

and geological mapping), was shipped from Ottawa. In the meantime, the American NEST organization arrived with three. Two spectrometers were already mounted in two *Hughes 500* helicopters, which had been transported to Edmonton by the *Starlifters*.

However, the limited range of the helicopters precluded their use in the vast North. Rather than waste time dismantling and transferring the equipment, one of the helicopters was pushed into the back of a CF *Hercules*, and at 1:30 a.m. on January 25, the first search flight was airborne.

clear reference points. North of the treeline the pilots looked out on a white featureless land where only instruments could assist in maintaining accurate lines. In an area with few navigational aids and a reputation for compass unreliability, the aircrew and scientists had cause to worry about their ability to pinpoint a hit.

Meanwhile, back in the cargo compartment, the scientists took turns watching several needles as they slowly swayed up and down across a piece of graph paper, waiting for the telltale swing that would indicate a hit.



Above. Scientists spent hours in the back of *Hercules* aircraft, watching for the swing of a graph needle which will indicate a hit. (EG&G photo 1447-5). Below. The workhorse of Operation Morning Light; a CF *Hercules*. (EG&G photo 1568-34)



Three *Hercules* carried out five search missions that day. Soon the rhythm of the search developed. An aircraft would take off for a 12 to 14 hour mission. Upon return it would refuel and take off again with a new crew and team of technicians. Fourteen hours later the cycle would begin again with another crew.

In the air, the work was tedious. The aircrew took meticulous care to keep on course as the aircraft lumbered up and down imaginary lines one mile apart across the tundra.

Navigation was a major problem. South of the treeline (which cuts across the projected satellite track just northeast of Great Slave Lake) there were

Late Wednesday night they had their first success. A *Hercules* with an American team aboard reported a hit in sector five, approximately 300 km east-northeast of Great Slave Lake. But, when the tapes from the gamma ray spectrometer were run through a computer in Edmonton, the proportions of uranium, thorium and potassium were not what could be expected from a Uranium 235 core. The scientists faced one of the classic problems of this search. The rocks of the North are full of uranium, thorium and potassium in varying concentrations. Was this hit an outcropping of natural uranium, or was it a piece of the reactor core so dense that it had buried itself deep into the tundra? Or

was the search equipment simply miscalibrated? Exhaustive discussions on this matter continued for the next few days.

#### BAKER LAKE

It soon became clear that if down-range hits were to be checked out, a forward search detachment had to be set up nearer that end of the search area. On January 26, the centre of the search shifted to the east when Lieutenant-Colonel Donald Davidson flew into Baker Lake with a mixed American-Canadian scientific team, a photographer, a rescue specialist and communications personnel.



The same day a 450 Squadron *Chinook* helicopter arrived from Yellowknife with three NAST team members. The *Chinook* had flown 3,000 km directly from an army exercise in the Chilcotin area of British Columbia.

That night, the detachment carried a radiation check of Baker Lake, a com-

munity of approximately 1,000 Inuit. Operations were set up in the Iglu Hotel, a large quonset hut. During the next two days, in -40°C temperatures, they carried out the first helicopter searches at the far end of the search zone, with negative results. (See Baker Lake story on p. 22).

#### HITS CONFIRMED

At the operations centre in Edmonton, resources available for the search continued to increase. The Canadian gamma ray spectrometer arrived on the morning of the 26th, and was quickly installed in a fourth *Hercules*. The Canadian scientists were keen to watch its performance, as the spectrometer had



been designed and built only last year by Quentin Bristow of the Geological Survey of Canada.

A U.S. DOE *Convair* turboprop aircraft arrived the same day to begin flying infrared search and photographic runs over the satellite track. On January 29, two *Argus* maritime patrol aircraft arrived from CFB Summerside to assist in the search. The *Convair's* infra-red searches were to prove fruitless, but its photographic runs plus those of the two *Argus* provided invaluable aerial photos of hit sites and the entire search area. In the afternoon a team of AECB scientists arrived in Edmonton to round out the initial Canadian-American search team.

At this point, the tally of CF aircraft now involved in Operation Morning Light included four *Hercules*, four *Twin Otters*, three *Twin Hueys* and two *Chinooks*.

On the night of the 26th, a *Hercules* carrying the Canadian spectrometer loaded up with its crew and technical



The two men who discovered satellite debris on the Thelon River, Mike Mobley and John Mordhorst, point out the hit site on a map. (EG&G photo 1581-34). Below: The first search team at the Thelon River hit site. (EG&G photo 1495-13).

team plus a dozen journalists, eager to observe the search activity. The aircraft lifted off and headed north to search a section near the eastern end of Great Slave Lake. Soon everyone aboard was experiencing the monotonous search routine as the aircraft began the steady, laborious job of tracking along grid lines.

On the 17th and final pass, reporter Sid Handleman from the Toronto Star leaned over the shoulder of spectrometer operator Bob Grasty and asked why the needle was swaying so much. Grasty replied enthusiastically "I think we've got a hit." As everyone crowded around, the scientists and aircrew pinpointed the radiation source on near Great Slave Lake, just off the mouth of

the Hoarfrost River, 27 km north of Fort Reliance.

Computer analysis confirmed the hit. Two days later a second aircraft not only reconfirmed it, but also found several more hits in the same area. Operation Morning Light had its first unqualified success.

#### THELON RIVER

However, these discoveries were all but forgotten with the news that two young men had found pieces of metal at a site farther east. On January 28, the Yellowknife meteorological station received a radio message from six men camping for the winter at Warden's Grove on the Thelon River, halfway between Yellowknife and Baker Lake. They reported that pieces of metal were

protruding from the frozen surface of the river, 12 km from their camp.

Two of the men, John Mordhorst and Mike Mobley, had left the campsite on January 25 to travel by dogsled north along the Thelon River to learn more about the barrenlands. That morning they saw nothing as they passed the crash site along the far side of the river. Returning on January 28, the men turned off their trail to discover more about the area to the west of the Thelon. As they mushed around the river bend, they saw several pieces of metal extending out of a re-frozen crater. Mike Mobley walked up to the crater and touched the strange metallic structure. Not knowing exactly what he was dealing with, he backed off. The two

men cut their trip short, and returned directly to the camp at Warden's Grove.

The four other campers had already learned of the satellite's crash on their radio, after querying Yellowknife about the frequent overflights of search aircraft. The group immediately reported the discovery.

An incredible chain of unlikely events had occurred. A satellite with little likelihood of coming down on land or of surviving re-entry through the earth's atmosphere had done both. It had then broken up and spread across hundreds of kilometres of almost totally uninhabited snow-covered land. And two men, in the midst of that vast expanse, had stumbled upon several pieces within four days of the fiery crash.

The immediate effect of this report and the Hoarfrost River area discoveries was to bring the centre of the search back to Yellowknife. For the past few days, the staff at Northern Region Headquarters had monitored the search activity, but apart from a NAST check of Fort Reliance which revealed negative radiation readings, there had been little activity.

All this changed within hours. Under the command of LCol Alex Bialosh, a combined Canadian-American scientific team flew north, arriving in Yellowknife late in the night of January 28. By the next morning the new forward search detachment was functioning out of the NRHQ operations room.

The main objective that morning was to get into Warden's Grove and get the six adventurers out for a medical examination. The Thelon hit site was dead on the predicted satellite track, and the men's description of the crater gave the impression that something large and dense (perhaps the nuclear core) had penetrated the ice. If Mobley and Mordhorst had been exposed to enough radiation, they and their friends could be in grave danger.

A *Chinook* helicopter at Baker Lake lifted off for Warden's Grove as soon as the technicians could warm it up enough to start (a major problem at 40 below), and a *Twin Otter* flew east from Yellowknife carrying NAST members and Dr. Savino "Beanie" Cavender, M.D., an American nuclear medicine specialist. From Edmonton a *Hercules* took off carrying a gamma ray spectrometer, to check the hit site and to provide navigation assistance if required.

The *Twin Otter* picked up the four men who had not been to the crash site, and returned directly to Yellowknife. Mobley, Mordhorst and Dr. Cavender climbed aboard the *Chinook* for the short trip to the crash site, soon to be known as "Satellite One".

Faced with a radiation source of unknown strength, the search team was extremely wary of landing at the site. The helicopter came down on a small rise 500 metres away (where, a week later, a military camp would rise). LCol Davidson, NAST member Pte Mona Wilson, two American scientists and a photographer then waded through hip-deep snow towards the hit site, carefully monitoring their radiation meters.

The tree line extends north here, following the protection of the river valley. The search team gamely floundered through the snow and scrub brush until they reached the hard-packed wind-swept surface of the river.

Then they slowly moved forward. The radiation readings remained relatively low. The protruding metal produced readings of 10 to 100 milliroentgens per hour; not the several hundreds of roentgens per hour that the solid core would produce.

Had a major piece of the satellite crashed through the ice and imbedded itself in the river bed? The scientists could not immediately resolve that question. Time was running out.

The team was experiencing one of the major problems of the search. Satellite One was 400 km from the nearest airport (Baker Lake), and a one way trip took 2½ hours. Coupled with the extremely short Arctic day (approximately seven hours in late January), possible on-site time was a maximum of two hours.

Soon the helicopter pilots were urging the team to pack up and return. There was just enough time to photograph the site, take basic measurements, collect samples for later analysis and leave.

As the *Chinook* flew back to Baker Lake, the team learned that the gamma ray spectrometer in the overflying *Hercules* had discovered several more hits in the area.

The search force did not know it at the time, but fortune had been with them. The Arctic high pressure area which had brought frigid cold but calm weather to the area since the beginning of the search was about to end. By next morning, high winds would obliterate the Satellite One site. The opportunity to take detailed photos of the splash pattern (so valuable later in analyzing what had happened) would have been gone.

That night, Mike Mobley and John Mordhorst were flown from Baker Lake to Edmonton and placed in hospital to be tested for radiation exposure. The doctors soon concluded that they were perfectly healthy, with no more radiation exposure than one would receive from one or two X-rays.

The next day at a news conference they cheerfully related their experience to the world. When asked how he felt, Mike jumped and kicked his heels.

Upon their release from hospital, the two men were hired by the CF to act as guides in the Thelon River area. When that job ended they returned to their small campsite at Warden's Grove.

That night the CF became concerned about the security of the Satellite One crash site. The radiation situation was still not clear, and there were rumours that members of the news media were chartering aircraft to fly into the primi-

tive Warden's Grove airstrip.

The media flight never materialized. Instead, before dawn on January 31, four paratroopers from the Canadian Airborne Centre in Edmonton parachuted into Warden's Grove to set up a guard and take care of the dog team left behind when the men flew out. (See paratroopers' story on page 11).

#### GREAT SLAVE LAKE SEARCH

As the scientists analyzed the puzzling results of the Satellite One find, and reporters from around the world scrambled to interview the adventurers, operations out of Yellowknife continued. LCol Bialosh flew in with several NAST members and scientists to the Fort Reliance area to pinpoint the initial hits.

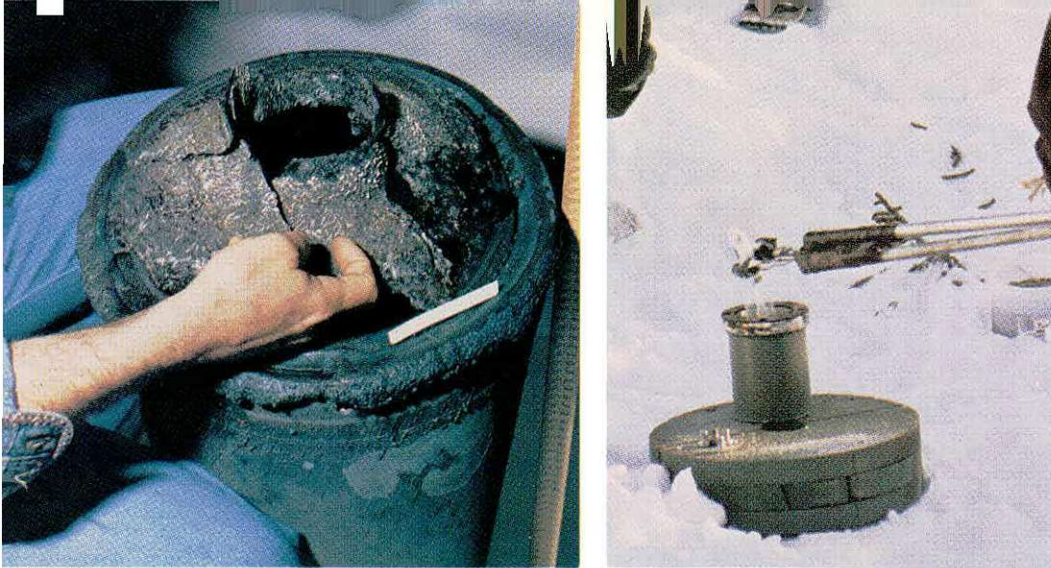
At this point in the search, the *Hercules* crews could give only an approximate position of the hits they discovered. *Twin Hueys* carrying radiation monitoring equipment then flew low over each hit site, circling until the hit was confirmed and its general location narrowed down. Then the scientists accompanied by NAST members would disembark from their *Chinooks*, spread out across the ice, and sweep the area. When the meters started to indicate a reading, the team would home in on the signal until they found the source. It was a process which demanded long hours on the wind-swept ice, in the bitter cold of the Arctic winter.

In this manner a 20 R/hr piece was located at hit one. It was a small metal bar, only a few inches long. The site was marked with flags and tape so that

Searcher puzzles over the debris at Satellite One hit site. (EG&G photo 1469-35)







Far left. The pieces of the puzzle start to come together. (EG&G photo 1507-6). Left. Using long tongs, a scientist places small pieces of radioactive debris in a lead container. (EG&G photo 1591-3).

recovery crews could return with a lead-lined cask to pick up the piece. Later the radioactive material would be shipped to the Atomic Energy of Canada Ltd's Whiteshell Nuclear Research Establishment (WNRE) at Pinawa, Man.

On Jan 30, the search teams returned to the eastern end of Great Slave Lake. This time they took with them two RCMP constables and two NRHQ military policemen to guard the hit sites. Aware that the radioactive pieces were only a short snowmobile ride from Fort Reliance, they were determined to prevent casual visitors. The weather had changed for the worse, forcing the site guards to pitch their tent out of the wind in the lee of a point of land 200 metres away.

With this job complete, the searchers turned to the task of checking hit two, a short distance away. Out on the open ice, with winds now so high that the wind chill factor was dropping below  $-100^{\circ}\text{C}$ , the team set up their search pattern.

As they started to walk towards the suspected hit site their personal radiation dosimeters began emitting a high pitched chirping sound. Soon the air was filled by what sounded like a field of crickets. Suddenly needles on hand-held instruments began to bounce off the low range scales. The team had located a small piece of metal emitting 200 R/hr.

The search team carefully marked the site, and, again faced with limited onsite time, returned to Yellowknife. There the scientists puzzled over the problem of recovering the 200 R/hr source.

None of the normal AECB lead-lined casks were designed to provide protection against such a powerful source, and a man exposed to only two hours of such radiation would probably die. The only solution was to manufacture an appropriate container. The job was given to technicians at the University of Alberta, while the search teams continued with other search and recovery efforts.

That same day, a NAST element flew to Snowdrift, to check the 90 Indian residents for radiation. As the team disembarked from its aircraft and spread throughout the village, the natives fled indoors. They didn't know what was happening, and they didn't like it. The next day NRHQ commander, BGen Ken



## JUMP INTO NOWHERE

there to prevent unauthorized personnel from inspecting the Cosmos 954 crash site.

It would mean a night drop into an unknown area, 400 km away from the nearest community. It would also be the CF's first operational night drop in many years.

That evening the four men packed and rigged their equipment for airdrop and drew personal weapons, ammunition and rations for five days. They were advised that six men had been hurriedly flown out of Warden's Grove, and that six Husky dogs had been left behind.

By midnight the paratroopers were on their way north in a C-130 Hercules. At Yellowknife they received a note from the Warden's Grove residents on an important subject — the care and feeding of the dogs.

On a quiet Sunday evening at the end of January, Sergeant John Phillips received a phone call from his headquarters at the Canadian Airborne Centre in Edmonton. He was to report immediately, with his winter clothing in hand.

When he arrived at Griesbach Barracks, he met three other men with the same task: Sgts Doug Riddell, Chris Cableguen and Cpl John Wickstrom. Their mission — to parachute into Warden's Grove in the middle of the Arctic barrenlands, and secure the crude airstrip.

The stop in Yellowknife was just long

enough to confirm the drop procedures. Then the Hercules was off again, roaring through the night towards Warden's Grove. By early morning the plane was circling over the site in total darkness, while the weather below deteriorated. Reports indicated temperatures of  $-40^{\circ}\text{C}$ , and winds in excess of 30 knots.

With the assistance of an Edmonton-based rescue specialist, flares were dropped, and under their brilliant light the paratroopers surveyed the scene. The adventurers' campsite consisted of two small cabins, a tent and a small dog kennel, all under the lee of a 100 metre high ridge. The Thelon River is approximately 400 metres away. The airstrip runs between the river and the camp.

Once orientation was complete and a drop zone selected, they dropped lighted drift indicators to ascertain wind strength and direction. On the basis of that information, the aircraft descended to 1,000 feet and a heavily-laden toboggan, followed by the four men, hurtled out into space.

Caught in a swirl of cross winds, only the first man in the stick, Sgt Phillips, landed on the drop zone. The other three, after only a few swings under their chutes, landed on the top of the boulder strewn ridge.

The three less-than-lucky paratroopers bounded among two metre high boulders before their chutes collapsed. Fortunately no one suffered anything worse than bruises.

The next task was to find the toboggan. The wind had caught its parachute, and without anyone to collapse it the toboggan had careened off the ridge, down the slope and across the tundra. Following its tracks across the snow, the

men were relieved to find both parachute and toboggan caught in a stand of stunted trees on the river bank. If the equipment hadn't been stopped by the bushes, the wind would have dragged it across the treeless tundra for kilometres.

Re-united at the campsite, the paratroopers radioed the still-circling Hercules and advised the aircrew that all was well. Only then did the aircraft leave.

On the ground, the four men checked the campsite and found the sled dogs sound asleep. The activity hadn't bothered them a bit.

A day later, a Chinook from Baker Lake dropped M/Cpl Pat Callaghan, a CF rescue specialist, and RCMP Constable Bob Grimstead at the satellite crash site 12 km from Warden's Grove. From that point on the paratroopers' prime task became secondary.

The paratroopers remained at Warden's Grove for a week, receiving occasional visits from supply aircraft and from the RCMP, who flew in two constables to assist in protecting the crash site. The only other visitors were the animals that abound in the Thelon River area, a federal game preserve.

One Arctic fox, nicknamed Grover, was so friendly that he would go right up to the soldiers. He lost some of his popularity the night he discovered that toboggan lines sweaty from human hands contain salt. He ate three metres worth before he was stopped.

On February 7, the first of the original Warden's Grove residents returned, and the paratroopers flew out. After the excitement of the first night, the paratroopers found their quiet week just fine.

Above left. During their stay at Warden's Grove, paratroopers worked out with the adventurers' dog team (IEC 78-448). Below. The four paratroopers in front of the Warden's Grove cabin. Left to right are Sgts Doug Riddell, Chris Cableguen, John Phillips and Cpl John Wickstrom. (IEC 78-436)



Above. Lead pig used to protect people from 200 R/hr source was so heavy that a recovery vehicle was used to transport it from aircraft to storage area. (EG&G photo 1540-18). Below left. NAST members carefully check the clothing of all recovery team members to ensure it is not contaminated. (EG&G photo 1522-20). Below right. NAST member checks Snowdrift natives for contamination. The results in all cases were negative. (News of the North photo)







Above. A *Twin Huey* waits while a scientist prepares to change the batteries on a microwave ranging system beacon. In the extreme cold, the batteries had to be changed every 48 hours. (EG&G photo 1566-19).



Above. A CF/scientific search team uses radiation meters to locate a small piece of radioactive debris. (EG&G photo 1571-24). Below. A scientist approaches debris found on Great Slave Lake. (EG&G photo 1501-16).



Thorneycroft flew to the village to explain the situation, and advise them that no radioactive sources had been found in Snowdrift.

On January 31, the Yellowknife-based recovery teams flew by helicopter over the ice of Great Slave Lake to recover the 20 R/hr source at hit one. As they flew eastward, they received a radio message from a nearby CF *Twin Otter*. Something had been spotted on the windswept ice of the lake.

The helicopters landed. This time the dosimeters did not break into their peculiar chirping. Instead the searchers came across a large stovepipe-shaped tube, charred from re-entry. Lying about in snow were a large number of smaller pieces. All were non-radioactive, and were quickly bundled up for transport to Yellowknife. The markings on these fragments furnished conclusive proof that Operation Morning Light had located parts of a Russian satellite.

The team then continued on its mission to recover the 20 R/hr source. Using long tongs, an AECB scientist carefully picked up a small metal rod and dropped it into a lead-lined cask.

But something in the area still emitted radiation. The 20 R/hr source had masked the presence of other radioactive pieces. After a brief search the team found another fragment, and it too was deposited in the cask. Multiple sources were to become a common discovery over the next few weeks.

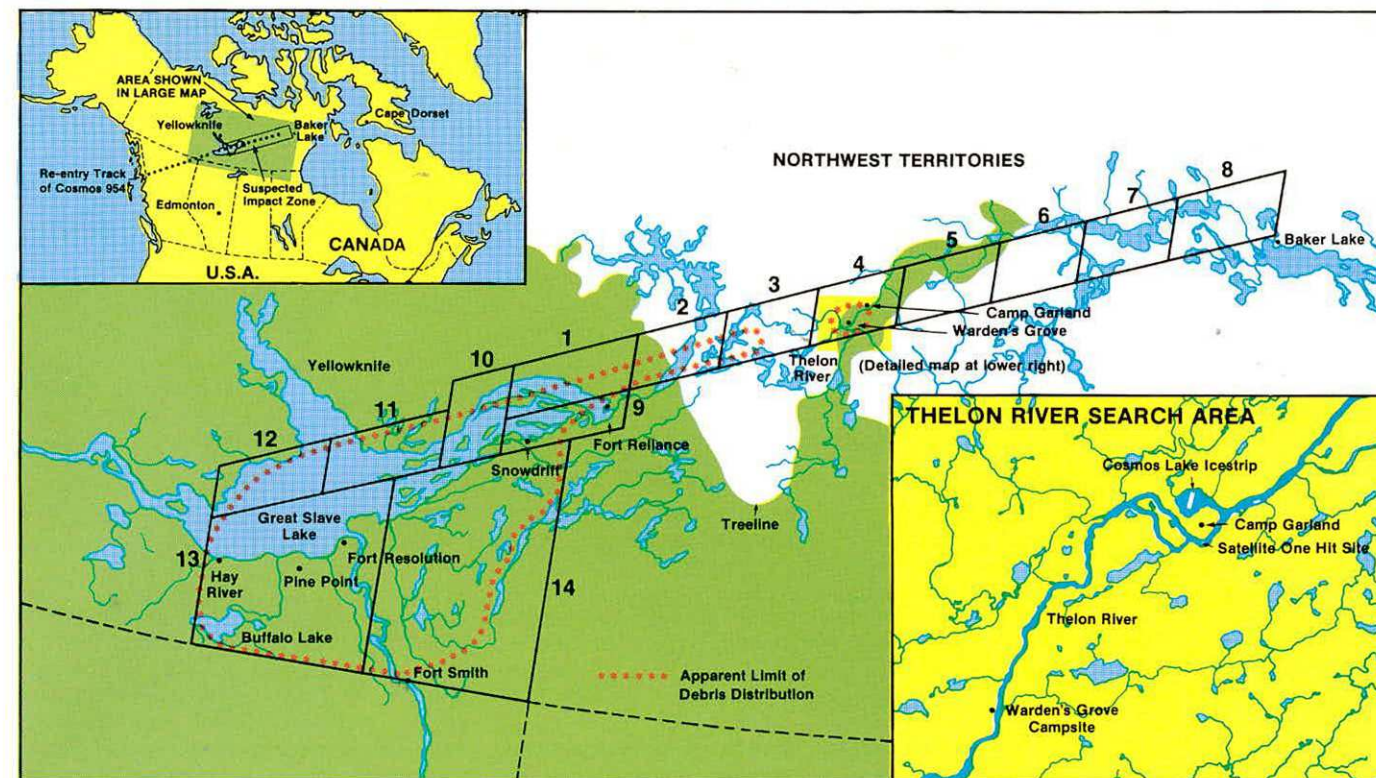
Properly sealed, the lead-lined cask was flown back to Yellowknife, and later to Pinawa.

Recovery teams and aircrew were checked for radiation after every mission. NAST members carefully monitored their clothing for contamination. Frequently the snow around a hit site was contaminated by minute radioactive particles, and mukluks or pants could be easily contaminated. Any item of clothing which produced a reaction on the meters was immediately removed. Wrapped in plastic for security during transport, the material was later shipped to WRNE in Manitoba for disposal.

#### PROGRESS ASSESSED

The scientific team had recovered satellite fragments. Now, the first steps could be taken towards completing the jigsaw puzzle that Cosmos 954 had become. Each fragment, when studied and analyzed, told more of the story of how the satellite re-entered, burned and broke up. This information improved the search team's ability to predict the locations of other satellite debris.

Simply stated, the probable position of a satellite fragment depended on its



#### THE AREA OF SEARCH FOR COSMOS 954

density and its shape. The scientists expected the lightest pieces with the largest surface areas to have the greatest resistance against the air, and to fall short in the westernmost section of the re-entry zone. Dense pieces with minimal drag would have travelled farther downrange, to the vicinity of Warden's Grove or farther.

The military commander now decided to enlarge the search area. With so many small hits in Sector One, two more sectors (numbered nine and ten) were added to the search area at the westernmost end.

By Jan. 31 the *Hercules* search aircraft had completed their general search of all ten sectors, and all hits created a "footprint" within a narrow ten km-wide strip, right down the centre of the predicted re-entry path.

However, neither the aircrew nor the scientists were satisfied with the accuracy of the grid patterns flown by the *Hercules*. The navigation problem was just too great to guarantee a properly spaced search pattern over the entire area. On February 1 the commanders attempted to resolve this problem by flying three *Hercules* in a "V" formation, with the aircraft 200 metres apart. The planes flew up and down the entire length of the prime search area, in the hopes that all the prime terrain would be covered without any troublesome gaps.

The results were mixed. The spectrometers detected several more hits that day, but the pilots found that the strain involved in keeping such a tight formation for hours on end was extremely tiresome. The experiment was abandoned.

On February 2, the Americans flew in the solution to the navigation problem — a microwave ranging system (MRS). The MRS consists of directional beacons which are placed on two high points of land 20 to 50 km apart. A receiver/computer mounted in the aircraft receives the two signals and, using triangulation principles, monitors the exact position of the aircraft and enables the pilot to fly along a specific path.

Accurate coverage was now assured, and hits could be pinpointed to within 200 metres.

The beacons were placed in position in Sector One by helicopter, and on Feb. 3 the MRS went into operation. From that point on one MRS-equipped *Hercules* aircraft flew a 20 to 50 km square area each day. It would clearly take weeks to cover the entire search area at this rate, but at least it would be covered accurately and completely.

Search and recovery operations continued at the eastern end of Great Slave Lake throughout the first week of February, and on Feb. 4 the scientists were ready to recover the 200 R/hr fragment. The U of A technicians had constructed

a lead container (nicknamed "the pig") weighing more than 1/2 of a ton.

That morning, with Defence Minister Barney Danson and 30 members of the media observing, a recovery team dragged the pig from a helicopter and using tongs quickly put the source into the pig.

The observers obtained a clear idea of the problems involved in the search. They spent 1 1/2 hours flying to the site, then stood in the open in -40°C temperatures and high winds to watch the recovery operation. Cameras froze, and when bare flesh touched metal, it stuck. It was not an enjoyable experience.

#### RIDDLE SOLVED

During this week, the Baker Lake search detachment was experiencing its share of problems. The scientific team had flown into Satellite One again on Jan. 31. Through the winter's worst blasts of icy cold and wind, the scientists dug out the drift-filled crater in an attempt to find out what was below. Gas-powered ice augers froze in the bitter cold, and the team reverted to Inuit ice chisels to chip through the metre of ice. Underneath the scientists found a few centimetres of water and then sandy river bottom, but no sign of radiation.

This left them thoroughly puzzled. The only way the light strut-like rods





The Baker Lake search team spent a night in tents beside the Satellite One hit site. Red tape in background marks the contaminated area. (EG&G photo 1549-25)



LCol Donald Davidson and two scientists cook rations from their survival kit during night at Satellite One. (EG&G photo 1550-10).

found on the surface would have been dragged so far downrange was by something dense. But where was the dense object?

The search commanders had already considered this question, and plans were in the making for a detailed search of the entire area. There were even thoughts of damming the Thelon River in order to study the river bottom.

With an extensive search in mind, Col Garland directed LCol Davidson to pick a site for a landing strip and a forward base camp.

As the scientists continued taking their measurements on the river, LCol Davidson checked a nearby backwater-cum-lake (soon to be known as Cosmos Lake) for its feasibility as an airstrip. When time ran out. Leaving M/Cpl Pat Callaghan, a rescue specialist, and an RCMP constable to guard the site, the team flew back to Baker Lake.

The next day 450 Sqn maintenance crews fought the bitter cold to keep the *Chinook* serviceable, and a day later the team returned to the site to take more measurements.

On February 3, a *Twin Otter* and a second *Chinook* (recently arrived from 450 Sqn headquarters in Ottawa) carried the scientific team into Satellite One. After more hurried measurements, the scientists packed up and returned to the shut-down helicopter.

With everyone loaded in, the pilot attempted to start up. One rotor turned; but the other would not budge. Eighteen people faced a night outside in the middle of the Arctic winter.

This sort of predicament was exactly why rescue specialist Pat Callaghan was there. As darkness enveloped the scene and the temperature plunged, Callaghan instructed the Canadian and Ameri-

can scientists, the aircrew and NAST member Pte Mona Wilson to quickly erect a second Arctic tent. (Callaghan and the RCMP constable already had one set up).

Soon the search team divided into two groups (smokers vs non-smokers) and settled into their tents to a meal from the aircraft survival pack. It was a memorable experience for everyone, particularly for the American scientists, who had been working in balmy Las Vegas ten days before.

The aircraft breakdown was a blessing in disguise. It meant the scientists could spend all of the next day at the site, while LCol Davidson completed his ice thickness tests and plans for the airstrip at Cosmos Lake. By the time a *Twin Otter* returned to pick up the search team, the scientists had confirmed that nothing lay beneath the ice.

That night Defence Minister Barney Danson flew in to Baker Lake with senior officers from Edmonton to assess the situation. The search commanders also brought the results of laboratory tests conducted in Edmonton on Satellite One snow samples. It contained lithium, an element used in the shielding of nuclear reactors. When it contacts water, lithium reacts violently (in the same manner as sodium). The violent reaction of lithium and snow had created a large puddle which when refrozen caused the huge crater at Satellite One. The lithium then dissolved in the reaction. The mysterious crater was explained.

#### CAMP GARLAND BEGINS

The Thelon River area was becoming the focal point of search activity, particularly as the MRS search completed its survey of the western Great Slave

Lake area and moved downrange. It was clear that a camp and airstrip at Cosmos Lake were essential not only for logistics support, but also as an operating base for the recovery teams and the *Twin Hueys* they used to check the hit sites.

On February 5, Operation Morning Light moved into a new phase. The Baker Lake operation began to close down, and Cosmos Lake began to build up. That day, 10 pioneers and a medical assistant from the 1st Battalion, Prince Patricia's Canadian Light Infantry, plus a bulldozer driver from 1 Combat Engineer Regiment flew in by *Chinook* from Yellowknife to set up the first tents of what was to become Camp Garland.

The bulldozer needed to clear the 1,600 metres of ice airstrip on Cosmos Lake arrived next; dropped from a low flying *Hercules* by LAPES (Low Altitude Parachute Extraction System) on February 6. Cat driver M/Cpl Sid Behme immediately went to work. Snow, wind-driven until it packed like concrete,

Two NAST members check the low radiation levels around collected debris found at Satellite One.



slowed the operation. Another bulldozer and two more drivers would be required before the strip would be completed on Valentine's Day. (See Camp Garland story on page 17).

When the first 424 Sqn *Buffalo* aircraft touched down on the ice strip on February 15, three scientists were aboard. keen to unpack their equipment and get on with the detailed search of the area. Camp Garland was about to become operational.

During the next six weeks, up to 100 people made Camp Garland their home. *Twin Huey* helicopters operated from an inflatable hangar, carrying out detailed searches for hits in the area and taking scientists to them.

In addition to normal military communications systems, DND contracted with Telesat Canada to provide a satellite communications terminal at the camp. The 955 kg dish-type antenna was flown into Cosmos Lake on

March 3, and within 48 hours

the scientists and military commanders at Camp Garland

*Twin Huey* with a two-man scientific team was diverted from the search area to the western end of Great Slave Lake to check a peculiar hole in the ice. After inspection, scientists attributed the hole to natural causes, and the helicopter returned to the main search zone. But as it flew above the Snowdrift area, the radiation monitoring equipment started to register hits.

Circling low, the crew soon discovered a dozen hits on the ice of Great Slave Lake, five to eight km northwest of Snowdrift. The low flying helicopter had discovered radiation sources in the low milliroentgen range, too weak to be picked up by the higher flying *Hercules*.

That afternoon, recovery teams flew to this new site. They discovered many tiny particles, ranging in size from microscopic to peppercorn.

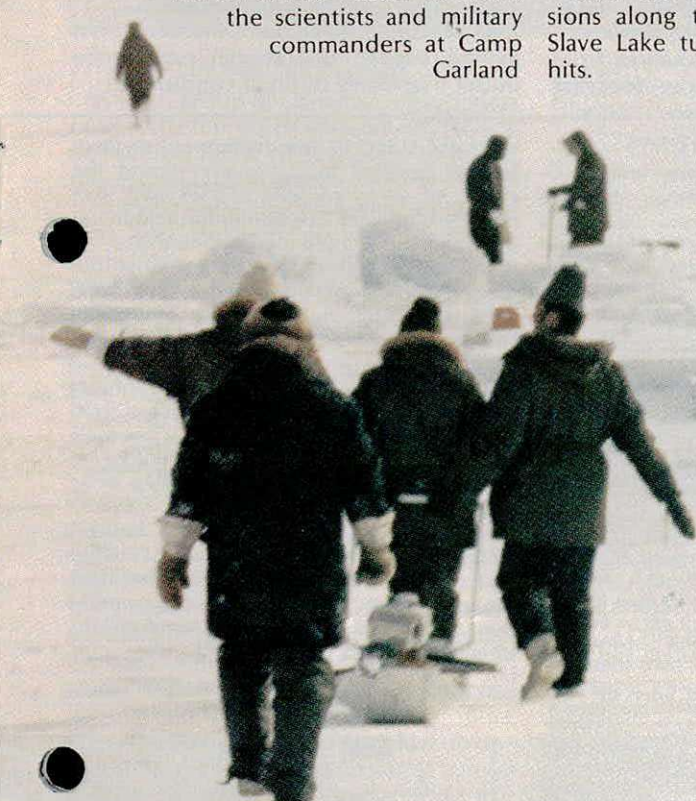
Later testing indicated that these minute pieces were fissionable material — the reactor core.

Over the next few days search missions along the south shore of Great Slave Lake turned up more low-range hits.

At last the searchers had an inkling of what had happened to Cosmos 954's reactor. It had possibly burned up on re-entry, but without complete combustion. Instead, minute pieces had fluttered down from the upper layers of the atmosphere. These radioactive particles, caught in the northerly winds of the night of Jan. 24, had drifted southwards to "dust" a huge area south of the predicted re-entry path.

The search effort was now aimed at defining the boundaries of the area of dust contamination. On Feb. 21, helicopters discovered low level radiation hits near Hay River and Fort Resolution. By the end of February the boundary of the additional contaminated area was defined. It contained 80,000 sq km from Hay River in the west to Buffalo Lake in the south, and east to a line drawn roughly from Snowdrift to Fort Smith.

The commanders of Operation Morning Light now faced a new problem. A huge area was contaminated by a fine sprinkling of radioactive particles, spread in random fashion, frequently hundreds of metres apart.



Left. Search team drags its equipment across the wind-swept surface of a lake near Cape Dorset to investigate a suspicious crater in the lake ice. (OPML 27-18). Above. In the latter stages of the search, recovery teams checked shovelfulls of snow for radiation, and deposited contaminated snow in garbage cans. (EG&G photo 1498-14). Below. NAST members check the community of Hay River for radioactive particles. (IE 78-59)



could discuss plans and problems with Edmonton (or anywhere else in North America) simply by picking up a phone.

#### NEW DIMENSIONS

In the meantime, there had been dramatic developments elsewhere.

Even before Camp Garland officially opened, the search had taken a new direction. On February 10, a 408 Sqn



# ICE STRIP ON THE THELON

## The story of Camp Garland



by Maj. Bill Aikman

A small group of Canadian servicemen now scattered on bases from Chilliwack to Trenton know what it's like to live in the eye of a hurricane.

They've experienced a kind of loneliness and isolation on the tundra in midwinter that even Robert Service would have been hard pressed to describe.

For while the world clamoured to learn more about the chunk of Cosmos 954 that plummeted onto the Thelon River, 30 servicemen lived and worked a few minutes walk from the crash site. Their task — to build an ice runway long enough to accommodate *Hercules* aircraft.

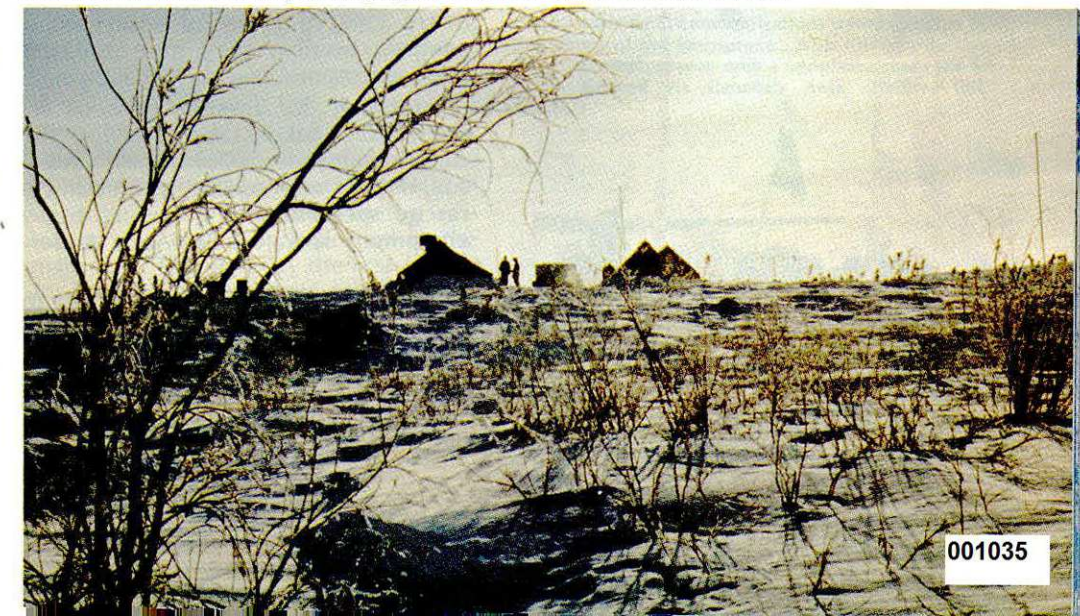
The airstrip was an operational necessity. Behind the decision to build it was the suspicion that the satellite's nuclear core might be found nearby. The recovery team, which had been making 800 km round trips to the crash site by helicopter, needed better access and more time on the ground to conduct investigations. And so Camp Garland, named for the commander of Operation Morning Light, came into existence.

It was to be an almost solitary existence for the first ten days. Bad weather sometimes prevented resupply helicopters from reaching the site, and the temperamental ionosphere prevented radio communications for days at a time. So, unaware of what was happening beyond the low hills that surrounded the camp, each man carried on, fighting his own private war against the piercing cold.

1978/2



Top of page. Over the threshold. A Buffalo from Trenton-based 424 Sqn. became the first large aircraft to land on the Cosmos Lake strip Feb. 15. The whole camp turned out to watch the touchdown and greet the arriving scientists. (ISC 78-1051) Above. Camp Garland and the Cosmos Lake airstrip as they appeared from the air while the operation was in full swing. (OPML 071-2). Below. ATCCT members maintained a sometimes lonely listening vigil on their bleak hilltop camp. (ISC 78-1058)



With the prospect of spring breakup in early May, neither time nor resources would permit clearance before the snow melted and the particles settled into the soil or the water of lakes and rivers.

AECB scientists recommended the search of all inhabited areas with ground teams to remove all contamination. In addition, *Twin Hueys*, capable of flying low and picking up lower radiation levels than the *Hercules*, would survey and clear all transportation routes within the area. Finally, the entire area would be divided into sectors and searched using the radiation detector-equipped *Twin Hueys*.

During the early part of March, Pine Point, Hay River, Fort Resolution and other southern Great Slave Lake communities were surveyed. In the vicinity of most of the communities the NAST team and scientists discovered a few dozen particles in the micro-roentgen range. There was no question of isolating each particle; a small amount of snow was simply shovelled into a plastic bag and carried away for disposal.

During March the search continued. There were some exciting moments when Inuit hunters on Baffin Island reported discovering a huge re-frozen crater on a lake 25 km northwest of Cape Dorset. The site was on the satellite track, and trajectory experts concluded that it was possible for an aerodynamically-shaped piece of Cosmos 954 to skip along the upper layers of the atmosphere and crash to the earth that far away from the other debris.

A *Twin Huey* helicopter was quickly dismantled and airlifted to Cape Dorset, where it flew a military/scientific team to check the site. No radiation was discovered in the area. After studying the site carefully the scientists (including ice experts from the National Research Council) concluded the refrozen crater was a natural phenomenon.

### WINDING DOWN

Along the main satellite track itself, several more hits (including one of 500 R/hr) were made between Great Slave Lake and Cosmos Lake. These were quickly picked up. By late March, it was apparent that the Cosmos Lake area was cleaned up, and the time had come to close Camp Garland. On March 29, the last flight departed from the ice strip that had been built with such great effort seven weeks before.

Even before this, the American element of the Operation Morning Light team had started winding down. At its peak, the American contingent num-

bered 115 people. Their knowledge and assistance had been invaluable, particularly during the early stages of the search. The last American scientist left Camp Garland on Mar. 7, and the last American gamma ray spectrometer was flown out on March 21.

The next day the Canadians bid farewell to the last group departing for their home base at Las Vegas. Canada's appreciation was expressed that day in a message from Prime Minister Trudeau to President Carter.

During April, a complete assessment of the operation took place in Edmonton and Ottawa. The search objectives had been met: all radioactive debris identified by the *Hercules* search aircraft had been picked up (from more than 60 sites); all communities and campsites plus their environs had been cleared, as had all transportation routes in the search zone. Radiation sources being recovered were now in the same strength range as the earth's background radiation. In addition, the scientists calculated that the radiation from the satellite core pieces was decaying

rapidly.

The danger to human and animal life had been minimized, and the search effort was now producing limited results. The time had come to reduce the military recovery operation.

On-going monitoring programs will continue throughout the spring and summer of 1978. As has been the practice thus far, DND and other federal departments and agencies will continue to support AECB, which is responsible for protecting the health, safety and security of Canadians with regard to nuclear energy.

Operation Morning Light has been an expensive venture for Canada. At the time of writing, DND expenses alone stood at more than nine million dollars.

There are hidden costs as well. CF aircraft flew more than 4,700 hours on search and resupply missions, taxing aircrew and the people who support them, and disrupting long-planned exercises and maintenance schedules.

In return, everyone involved has gained superb operational experience under extremely difficult conditions.

### THE WORLD WATCHES

Have you ever tried to answer seven telephones at once? Two Canadian and one American information officers attempted that during Operation Morning Light — not just once, but for seven straight 20-hour days.

When Cosmos 954 crashed in the N.W.T., the world's news media considered it the hottest thing since sliced bread, and for two weeks it was front page news. Several score national and international reporters invaded Edmonton and Yellowknife to cover the search. At the same time, media queries were phoned in constantly from as far away as Australia, Europe and Japan.

So many reporters tried to use the telephones to gather and pass information that their activities threatened to affect operations. So a section of CFB Edmonton's aircraft passenger waiting room became a media centre. There, Majors Vic Keating and Wally

West and U.S. DOE information officer Dave Jackson handled media queries round the clock. All seven available phones were frequently busy, and CFB Edmonton telephone operators had to keep media waiting lists.

The story was so big and complex that the major television networks had several news teams reporting on the search, some using Learjets to fly them between Edmonton and Yellowknife.

In the midst of this, information officer Capt. Craig Mills returned to Edmonton from a six-month tour in the Middle East, not even aware that a satellite had crashed. Before he had his bags unpacked, he was called in to help.

As the days passed and media interest increased, more information officers were sent to Edmonton and Yellowknife to assist the initial team. At the height of the operation, seven Canadian and two American information officers were involved.

At Yellowknife, Maj. Wally West briefs the news media about the six adventurers at Warden's Grove. (News of the North photo)







Above. Cpl Andy "S.B." Anderson and M/Cpl Duncan MacIntosh (on dozer) worked in frigid weather to clear 1,600 meters of runway. (ISC 78-1052) Below. M/Cpl Sid Behm proudly sits aboard his dozer moments before the first large aircraft landed on the runway behind him. (ISC 78-1053)



Below. Flags, taped music, the roar of an aircraft engine, and a deft slice with a snow knife marked the official opening of the airstrip. While the new camp CO, LCol Steve McGowan, left, and camp residents watched, LCol Donald Davidson (the outgoing camp commander) and M/Cpl Behm cut a piece of fluorescent tape. (ISC 78-1088)



Adventurers from Warden's Grove pay a visit by dog team to the fully operational Camp Garland, providing a diversion for scientists and CF personnel. Having neighbours in the midst of Arctic isolation was a great luxury. (ISC 78-1082)

Two *Chinooks* pounded their way to the Satellite One site February 5, carrying men and equipment for the project. Under the command of Lt Ted Bain, 10 pioneers and a medical assistant from the 1st Battalion Princess Patricia's Canadian Light Infantry, and a heavy equipment operator from 1 Combat Engineer Regiment tackled the job of setting up camp on a bleak hillside.

The next morning, the first D-4 bulldozer was jettisoned from a *Hercules* cargo hold and skidded onto the snow covered surface of a nearby river backwater. Within seconds the pioneers were unstrapping the dozer from its platform and filling it with fuel in order to start it before the Arctic cold could penetrate its engine block.

Less than five minutes later, M/Cpl Sid Behm, the heavy equipment operator, was driving across what would soon be called Cosmos Lake. Once started, the dozer was not shut off for weeks.

Sid Behm's first job was to clear a campsite and a network of roads around it. It was not an easy task, for among the stunted trees that fought for survival this far north the snow was one to two metres deep.

The pioneers began to mark out the airstrip, which fitted neatly on the lake between two low-lying hills. Using a 32 metre (100 ft) piece of rope and a compass bearing, they measured out 1,600 metres of runway.

Later that day another *Chinook* arrived from Baker Lake, carrying the camp commander, LCol Donald Davidson, supply and vehicle technicians, a rescue specialist and a second heavy equipment operator, Cpl Andy Anderson.

Aware of the urgent requirement to clear the strip, the two drivers worked continuously from first light until after dark.

It was not so much the darkness that

stopped them as the cold. The -30 to -40°C temperatures made sitting on the high, exposed seat of a cat thoroughly uncomfortable.

During the first three days of operations the winds gusted to 60 km/hr, driving snow against the drivers faces and through their heavy clothing. Each night the men returned to the tent damp from snow that had melted inside their parkas, and stiff-jointed from sitting still in the cold all day.

The rescue specialist and medical assistant took turns manning a tent beside the slowly growing airstrip, where the cat drivers occasionally stopped to talk and get warm.

Sid Behm and Andy Anderson not only had to fight the cold to do their job, they had to fight the snow. Driven by the wind, the 1/4 metre to a metre deep snow on the exposed lake was as hard as concrete. It took at least two cuts to clear one blade width. By Feb. 9, only 300 metres of the strip had been cleared.

Late that day a second bulldozer was dropped, and the pace picked up. On Feb. 11 the strip measured 800 metres. On Feb. 12, the drivers reached 1,000 metres. M/Cpl Duncan MacIntosh arrived the same day to help share the driving duties. The small advance party at Camp Garland began betting on when the first *Hercules* would touch down.

While the runway grew, other problems began to appear. At one metre thick, the ice barely met the minimum landing standards for a 65-ton *Hercules*. In radio conversations with Edmonton, it became clear that the *Hercules* pilots weren't enthusiastic about landing under such conditions.

The construction party let time and weather solve this difficulty. When the surface ice lost its insulating blanket of snow the cold penetrated deeper, and



Above. Hardpacked snow, wind-driven to the consistency of concrete, was difficult to move. Heavy equipment operators braved the extreme cold from dawn til after dark for eight days to clear the strip. (ISC 78-1062)

bit by bit the ice began to thicken.

But the bare ice was much colder than the water below, causing another problem. The ice temperature at the surface was -40°C. A metre below the water was 1°C. The ice began to contract and thermal cracks appeared. This, combined with the weight of the snow ploughed to each side, caused a narrow fault line to run right down the centre of the strip.

As the days passed, this crack grew to two and in some places three centimetres wide. Fearful that the fault could endanger aircraft operations, LCol Davidson ordered the cracks be filled. So for two days the pioneers combed the strip with jerricans, filling the cracks with a quick-freezing mixture of water and snow.

While the effort continued on the ice of Cosmos Lake, life carried on apace for the 30 persons living in the collection of tents that made up Camp Garland. During the day three cooks produced hearty meals in a modular tent which doubled as sleeping quarters.

Lt Mike Bolohan from 1 Construction Engineering Unit at CFB Winnipeg bounced between the tent and runway studying the feasibility of using an ATCO ablation trailer at the site, tabulating ice thickness and researching lakebed information.

A short walk away from the main tent, on the highest point of land near the camp, stood the tents of the Air Transportable Communications and Control Team (ATCCT).

ATCCT is a Trenton-based organization which has the capability of setting up the communications, radar and airfield lighting systems at forward airheads. Originally deployed to Baker Lake and Yellowknife, several of its men flew to Camp Garland on Feb 7. Soon the camp had communications with the outside world, an internal VHF radio system, and a TACAN radar beacon to assist aircraft in reaching the airstrip.

The radio link was tenuous. In this part of the world the aurora borealis dominate the skies, frequently playing havoc with communications. On Feb. 12 the nightly display of eery lights reached its height, and at the same time fouled communications. For the next 48 hours, the communicators couldn't raise another station with either morse or voice transmissions.

The weather also caused difficulties again. The sky clouded, turning the Thelon River basin into a horizonless grey world. Ice fog settled in. No helicopter would be able to navigate its way to this isolated post.

Late in the afternoon of Feb. 14 LCol Davidson walked the length of the strip with LCol Steve McGowan, CO of 408 Tactical Helicopter Sqn, who was to take command of Camp Garland upon its completion. (Or, as he commented to C-130 pilot Davidson, "After the first *Hercules* goes through the ice".) All but 200 metres were complete, and the thermal crack was patched up.

When a *Hercules* aircraft flew low on yet another LAPES delivery mission, the camp commander radioed that the airstrip would be ready to receive heavy aircraft the next day.

That night, well after dark, three cold and hungry but jubilant bulldozer operators burst into the dining tent. The strip was complete.

Shortly after noon on February 15, a 424 Sqn *Buffalo* aircraft from CFB Trenton touched down on Cosmos Lake. When it taxied to a halt in front of a cheering group of spectators, out stepped a three-man scientific team, led by Dr. Norm Bailey. Soon pallets of scientific equipment were being off-loaded and towed by bulldozer to the main tent. The next day the first *Hercules* landed, carrying more scientists and their equipment.

Camp Garland had entered its second phase — the downrange search and recovery centre for Operation Morning Light.



Above. C-c-c-cold temperatures made keeping warm a priority. Camp members inspect a temperamental Herman Nelson heater outside the mess tent. (ISC 78-1071)



Above. Lt Mike Bolohan of 1 CEU gamely dips his hand for a sample of water from Cosmos Lake. A couple of minutes later he had to break surface ice with a pick to continue the job. (ISC 78-1060). Below. Camp Garland's communications problems were solved by a Telesat Canada earth station. In the camp's early days, communications were restricted by the whims of the ionosphere. With the introduction of the terminal, anyone with a telephone could talk to Camp Garland via Canada's Anik satellite. (ISC 78-1087)





by Maj. Bill Aikman

How do you explain the concept of a nuclear-powered satellite to people who have no words to describe a satellite, let alone nuclear radiation?

The task demands some effort and imagination, as LCol Donald Davidson discovered when he spoke to several hundred Inuit people in a Baker Lake school gymnasium last winter.

LCol Davidson was at the school to tell the native people about the potential danger of Cosmos 954, the Soviet satellite that had crashed in the north. Pausing frequently while an interpreter translated his words into Inuktitut, LCol Davidson explained why military personnel and scientists had been sent upon the community (population 1,000) and why airplanes and helicopters were constantly flying overhead.

His audience was concerned. They wanted to know what radiation would do to the caribou, to the fish and to them. In the end they accepted the explanations and welcomed the strangers into the community. It was an excellent example of community operation at work.

Three days later, the entire search team was back in the gymnasium, this time to watch a native drum dance put on in their honour.

Such was life at Baker Lake. During 12 days of operations, the Morning Light detachment developed a character all its own.

The detachment was set up January 26 with the arrival of LCol Davidson, three NAST members and a mixed Canadian-American scientific team. They began operations in the only place in town big enough to accommodate them — the Iglu Hotel.

The Iglu Hotel is a large quonset hut owned by the village. It contains double rooms and bunkhouse-style sleeping quarters. No alcoholic beverages are sold, at the request of the Inuit community.

The new customers were surprised by the \$63-a-day room and board charge, until they realized that everything they ate had to be brought in by air freight. Later, as the search team grew and overtaxed the hotel's resources, a CF cook joined the staff to help prepare meals.



Top. As darkness settles over Baker Lake, a Chinook helicopter returns from Warden's Grove. (E.G.G. 1455-04) Above. NAST member Pte Mona Wilson dresses against Arctic cold. (E.G.G. 1479-4)

# BAKER LAKE

## The Search Moves Downrange



The scientific team began their search January 27, leaving behind Capt John Lyne, of the NAST team, and team member Pte Mona Wilson to talk to school children about all the puzzling activity. Their school visit sparked the request for an explanation to the whole community.

Pte Wilson's presence intrigued the Inuit girls, who were astonished to discover that women serve in the Forces. The young Edmonton servicewoman spent more time answering personal questions than queries about satellites.

On the same day LCol Davidson spoke to the community, word was received that pieces of Cosmos 954 had been found on the Thelon River. The Baker Lake detachment was ordered to investigate the site, and the next day LCol Davidson headed the search party



Above. LCol Donald Davidson explains the Cosmos 954 search situation to Inuit at Baker Lake. (E.G.G. 1458-45) Below. Herman Nelson heaters had to run for three hours before a Chinook would start. (ISC 78-2000)



to the edge of the mysterious crater.

The Baker Lake group travelled 400 km to the hit site in a Chinook helicopter.

Initially, 450 Sqn's powerful helicopters provided the best means of getting people and equipment into Satellite One. However, the long distances required that each helicopter be outfitted with three rubber fuel bladders; a situation which reduced the load capacity.

In addition, the Chinooks were operating to the limits of their capabilities in the cold Arctic environment. Helicopter serviceability problems and harsh weather plagued the operation for the next week.

The Chinook is a complicated aircraft. It has five transmissions and three hydraulic systems, which in cold weather require 14 to 16 man-hours of maintenance for every hour flown. In the Arctic winter, where rubber seals deform and oil freezes solid, the strain was just too much.



Five Baker Lake detachment members were the first searchers to reach Thelon River hit site. Four pictured above are Paul Mudra, Pte Mona Wilson, LCol Don Davidson and Tom Crites (E.G.G. 1495-09) Below. Baker Lake community. Quonset hut at centre right is Iglu Hotel. (E.G.G. 1552-09)



It was tough on the maintenance crews as well. Working without a hangar in temperatures that dipped below -100°C with the wind chill, the technicians were restricted to 2½ minutes work in the open at a time.

Even simple procedures such as starting the aircraft engine were extremely difficult. The heat from a Herman Nelson heater had to be directed into the engine and transmission compartment for three hours before a cold-soaked engine could be started. Any less time would damage the seals.

Such maintenance difficulties restricted flights to Satellite One to every second day.

While the technicians performed their heroics at the Baker Lake airstrip, the scientists developed methods of photographing underneath the ice in preparation for the search to come on the Thelon River.

Pte Wilson was busy as well; gathering souvenirs for the cub pack she leads and

arranging pen pal relationships between children in Baker Lake and Edmonton. She even acted as an impromptu recruiting officer, making a return trip to the village school to explain more about life in the Forces.

But Pte Wilson never allowed these activities to interfere with her NAST duties. She was one of three people who made the trip to Satellite One on every expedition up to the formation of Camp Garland.

With the decision to open up a base camp at Satellite One, the Baker Lake detachment lost its raison d'être. The detachment closed shop with a grand finale — a visit by Defence Minister Barney Danson.

While detachment members rushed to buy souvenirs and thank the Inuit people for their hospitality, Pte Wilson got ready to leave with something extra. She had been "adopted" by 450 (West) Sqn. And she proudly displayed the squadron crest to prove it.



# LAPES FLIGHT 6840

by Lt. Wendy Tighe

These men, the ones who work at CFB Edmonton loading big pallets with 45-gallon drums of fuel, skidoos and sometimes even bulldozers, must have been up all night.

It took ten of them six long hours to strap together 9,100 kg of aviation gas, hoist the loaded pallet onto a roller-equipped truck bed with a crane, drive it to a waiting *Hercules*, hydraulically lift the truck bed up level with the landing ramp, and then slide the pallet onto the aircraft cargo rollers and strap it down again.

Now the same men are at work under the bright lights of the nose dock in an

old alert hangar, carefully packaging a D-4 bulldozer with layers of two by fours and horsehair, reams of nylon straps and heavy metal buckles.

Late this afternoon the "cat" will be delivered to the Canadian Forces' Cosmos Lake base camp site in the Northwest Territories, only metres from a spot where a chunk of the Soviet Cosmos 954 satellite still sticks out of the snow.

It will be delivered at a speed of 130 knots from a *Hercules* flying about one to two metres above a frozen lake. Three large parachutes will bring it to a snow-spewing halt. Minutes later, somebody will drive it off the pallet and put it to work, stopping only long enough to reassemble the blade.

The fuel load now aboard the aircraft faces a similar fate. In a few hours it will be dropped on Great Slave Lake alongside the tiny community of Fort Reliance.

Several *Hercules* crews at CFB Edmonton's 435 Squadron are trained in the quasi-science, quasi-art of dropping

cargo via the Low Altitude Parachute Extraction System (LAPES).

To the layman, a routine LAPES drop is a death defying spectacle. The sight of all that ground coming up under all that aircraft is enough to leave one permanently bug-eyed.

To the pilot it's a skill; a matter of keeping the plane level, nose slightly up, wheels off the ground. It's a marriage of experience and aerodynamics; a business where efficiency outweighs the risks.

To those on the ground, a LAPES drop often means the difference between survival and comfort, getting a job done or sitting idle; especially in the north.

And that's where flight 6840 out of Namao is headed. The crew from 435 Squadron scrambles aboard the Herc and minutes later it is moving along the taxiway, through snow that has drifted over miles of open prairie, past the hangar line and into that gray space

between night and morning.

The pilots, Captains Bob Lee and Mike Taylor, lift 68,000 kg of loaded aircraft off the runway, their hands working the throttle together.

Clouds obscure the flat earth below as the plane climbs and swings northwards. A great orange ball of a sun appears, prompting somebody to make a joke over the intercom about listening for the crack of dawn.

Breaks in the cloud cover reveal Fort McMurray, and beyond it a changed landscape. Bald prairie has given way to rolling hills.

The loadmaster prepares a hearty breakfast for the six-man crew. They finish up as the landscape ahead begins to change again. Rocky hill tops, deep trenches and winding ridges spread in every direction, monuments to the relentless drive of the glaciers.

The lakes begin. Here they are called by polite surnames. Farther north men named them from experience; a not entirely pleasant experience as Lakes

Disappointment, Desperation, Defeat and Perish describe.

Beyond the snow covered pockmarks of the small lakes is the big daddy in this neck of the woods — Great Slave Lake. And perched on a spit of land which juts into the broad expanse of McLeod Bay is Fort Reliance.

Four, perhaps five houses and a communications building make up this tiny community, augmented today by a yellow ski-equipped *Twin Otter* from 440 Squadron detachment in Yellowknife.

Smoke marks the drop zone on the lake below. Aircraft Commander Bob Lee is satisfied with the pre-drop arrangements, and the Herc makes a big circle before beginning a gradual descent.

In the cargo hold, loadmasters Sergeant Rick Grinham and Master Corporal Andy Robicheau have checked and rechecked the equipment; the drogue chute, the main chute and the loaded pallet. Their job now is to wait for the go ahead from the cockpit.

The once smooth-looking lake sur-

face takes on a rippled appearance through the open ramp. The wind packs the snow like concrete up here, then sculpts it into shallow dunes.

The plane is low now. A quick exchange between the cockpit and the loadmasters and the drogue chute spreads out; bright red stripes taut in the cold, clear Arctic air.

Up front Bob Lee works the flight controls; keeping the aircraft level as the interval between the deployment of the drogue chute and the main chute stretches to ten seconds, then past ten . . . "Cut the drogue" is the terse order from the cockpit. The jettisoned canopy bursts away with a crack like a rifle shot, and milliseconds later the aircraft wheels cut through the hard packed snow surface. Something has gone wrong.

With a roar, four powerful engines pull the Herc off the snow and over the rocky ridge. Capt Don Ward, a Herc pilot who came along to see how a LAPES drop is done, slides into the aircraft commander's seat. Bob Lee goes

back to the cargo hold to find out what the problem is.

The culprit, it seems, is a lynch pin that didn't pull out of the way to allow the drogue chute to haul the main chutes and the load off the ramp. Bob Lee decides to try the drop again.

Silhouetted on the open ramp, the loadmasters begin rigging another drogue. Behind them, trees, snow and sky turn topsy turvey as Don Ward and Mike Taylor mark time with big, lazy circles.

The chutes are checked and re-checked. Bob Lee takes command, and circles Fort Reliance one more time. Again the plane descends to 250 feet above the lake surface. The drogue chute unfurls and is pronounced "good" by the senior loadmaster.

75 tons of aircraft descend to five feet. The seconds are like hours. Time drags unbearably as the plane hurtles along above the snow. A sudden whoosh, and the wait is over as the main chutes whip off the ramp and fill the air. It's a matter of one, two, three before the load slides along the rollers and sails out the door.

9,100 kg lighter, the Herc gathers speed and height. Below, the pallet has come to a stop, and the *Twin Otter* begins to roll and bob towards it. The delivery will keep airborne a small fleet of *Hueys*, *Chinooks* and *Otters* covering this area as part of Operation Morning Light, and needless to say, the residents of Fort Reliance will have something to talk about for the rest of the winter.

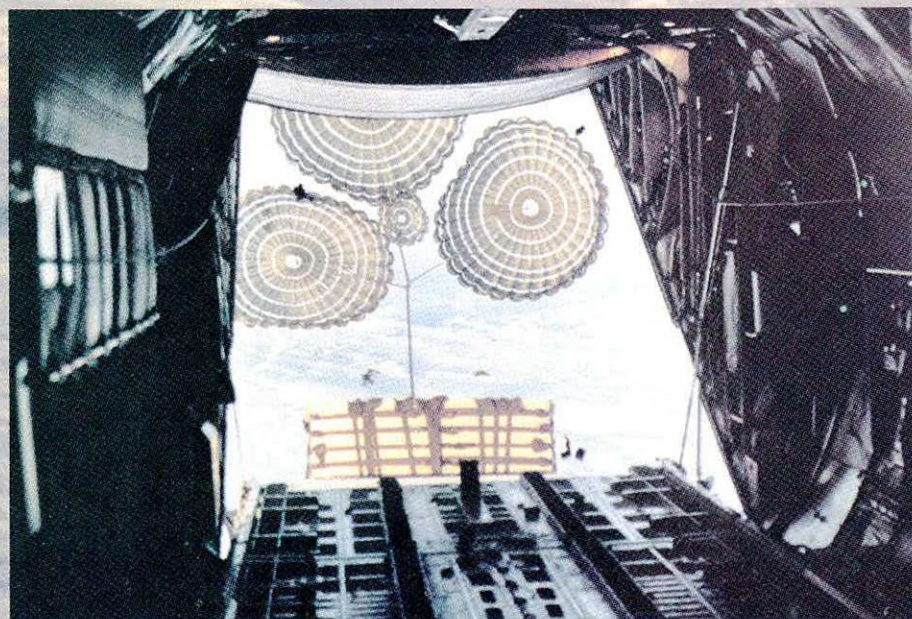
On board the aircraft the crew relaxes. They've completed a tough job with consummate skill, exhibiting all the confidence of a professional team; no raised voices or pointing fingers, just calm, collected concentration at even the most critical moments.

With the task at hand over, the aircraft turns for home and everybody begins watching the snow below for wildlife.

Back in Edmonton, a 15,000 kg bulldozer sits securely anchored to a steel pallet, ready for the trip north. Today, at last light, this same crew will drop it out of the sky at Cosmos Lake — affectionately known at 435 Squadron as LAPES Lake. After all, in a week the squadron has dropped almost a quarter million kilograms of fuel and equipment at Fort Reliance and the Cosmos Lake base camp site.

But for now, there are caribou tracks below, and somebody has just spotted a wolf prowling through what has to be the most spectacular scenery in the world. Like any other job, a LAPES flight does have its perks.

Above and Below. A fuel-laden pallet kicks up snow as it shoots out of a *Hercules* flying feet above Cosmos Lake. These pictures were snapped at almost exactly the same moment by photographers on the ground and in the aircraft. (ISC 78-1046, E.G.G. 1594-31)



Below. Tense moments during Flight 6840. Still carrying its cargo, *Hercules* climbs to clear the ridge at Ft. Reliance, seconds after its wheels cut through the snow on Great Slave Lake during an unsuccessful LAPES drop. Photo was snapped by Dan Petrunik of the Ft. Reliance weather station. (ISC 78-1047)





# Hockey in Uniform

## 30 years of service hockey

by Capt. G. Baril

Many teams and players have left their mark on military hockey since the Second World War. It would be futile to try to mention them all, since most leagues created in that time dissolved after two or three years.

To recall the most memorable moments of a rich hockey history as accurately as possible, we have relied upon accounts provided by those who were there at the time. We wish to thank Orval Gravelle, Cal Hatt, Jim Gebhardt, Sam Saumier, "Twit" Leblanc, Frank Oatway, Bob MacDonald, Jack Gilbert, Fernand Gingras, Laval Poulin, Ray Boucher and others for their valuable assistance.

If there is a hockey team whose name will long be remembered in the Canadian Forces, it is the Royal Canadian Air Force Flyers who won the gold medal at the 1948 Winter Olympic Games. We should point out however, that the Flyers were not, strictly speaking, a military team. Most of the players were professionals or semi-professionals who

enrolled in the RCAF only for the duration of the world championship.

Orval Gravelle was one of them. In the spring of 1947, George Dudley, president of the Canadian Hockey Association visited him at the New York Rangers' training camp and suggested that he join the Canadian team that was to play in the Olympic games at St. Moritz, Switzerland the following year.

Gravelle, scarcely 19, was interested; but there was one hitch. Because the RCAF was the only organization that could meet the needs of such a team, Gravelle would have to enrol for several months. He accepted.

Thirty years later, Orval Gravelle is still congratulating himself on his decision. After the championship, he was one of two team members who decided to stay in uniform.

He still vividly remembers that first taste of adventure. He also remembers the bitter 7 — 0 defeat at the hands of the powerful McGill University team in Montreal a few weeks before the championship games. Eight players were cut the day after that disappointing match, and replaced by eight more.

A victory over the Montreal Royals, a strong senior team of the period, soon restored the spirit and confidence the Flyers would need to face the best amateur teams in the world.

Then it was off to Europe for a long series of exhibition games, followed by the Olympic games at St. Moritz.

The experts of the day rated the Flyers' Olympic chances as slim. At best, it was conceded that they might finish fourth. But the experts failed to take into account the determination of such men as Gravelle, Guzzo, Dunster and Mira.

Canada finished the series (which was held outdoors) with seven wins and one tie. Czechoslovakia's tally was identical, but the Canadians had scored more goals. The Flyers took home the gold medal.

A whirlwind of banquets and receptions followed the team's arrival home. So did an exhibition game against the mighty Montreal Canadiens. The final score was 4 — 4.

The Flyers continued to compete in a senior league in the Ottawa area until 1954. The team's glorious accomplishments were in the past by then; it failed to attract good players and was disbanded.

About the same time the Flyers hung up their skates, RCAF Station Saint Jean boasted one of the best military hockey teams. The Saint Jean team won the Eastern Tri-Service Hockey League championship in 1954 and 1955.

The tri-service league drew its players from military bases in the Montreal area. Chief Warrant Officer Laval Poulin and Captain Jim Gebhardt played for Saint Jean during those years. CWO Poulin recalls the strong opposition RCAF players provided young hotshots such as

Henri Richard, Ralph Backstrom and John Hanna, all of whom lined up for the Montreal Junior Canadiens.

Jim Gebhardt remembers a particularly rough exhibition game between Saint Jean and a military team from Ottawa. In particular he remembers getting into a fight with opposition player Orval Gravelle. Some years later both he and Gravelle found themselves together on the same team, and the two former combatants became the best of friends.

Both Gravelle and Gebhardt play on "Old Timers" teams now, one at CFB Borden, the other for the town of Trenton.

### THE HEYDAY

Canadian Forces hockey enjoyed a heyday between 1953 and 1957. Strong

teams developed in Clinton, Aylmer and Ottawa, Ontario; Saint Jean, Quebec; Greenwood, Nova Scotia and Zweibrücken, Germany. Hockey remained less popular in the west.

The Nova Scotia Armed Forces Senior Hockey League provided what many considered to be the best hockey in the Maritimes. Games between teams from Cornwallis, Shearwater, Aldershot, Greenwood and Halifax were televised, at a time when such media coverage was rare.

The Greenwood Bombers won the league championship repeatedly, through excellent teamwork and the considerable talent of players Danny Carroll and Fraser Dunn.

Carroll was a natural scorer. Dunn, on

the other hand, had the style and physique of Gordie Howe. Besides displaying a powerful wrist shot, he was one of the first to develop the slapshot.

Bob MacDonald, goaltender for the Aldershot team at the time, still remembers his first game against Greenwood. "Dunn let fly such a hard slapshot at me that I flew backwards into my net," he said. "I had never seen anything like it."

Military hockey developed in Europe gradually during the mid-50s. In 1954 and 1955, the 3 Wing (Zweibrücken) Flyers played exhibition games against German teams. The following season they joined the German "A"





Division Hockey League, mustering a superline of Frank Oatway at centre, "Twit" Leblanc, right wing and Johnny Johnson, left wing.

Vic Nolan, "Muck" Reading, Yves Garand, "Bud" White and Jim Gebhardt (who, although stationed in England, occasionally came to lend the Flyers a hand) also played on the team.

During those years, the Flyers faced a line up of visiting North American teams which included the formidable Penticton, "Vs", the 1954 world champions, the United States national team, the Kitchener-Waterloo Dutchmen and the Whitby Dunlops, who won the world championship in 1958.

The 3 Wing Flyers withdrew from the German league in 1959 to join the three other wings in Germany and Marville, France, to form the strictly Canadian Air Division Hockey League.

In the late 1950s and 1960s, the 4 Canadian Brigade Hockey League provided exciting hockey in northern Germany. The Black Watch Regiment reigned supreme, winning the championship and the finals on three occasions.

Centred around two brothers, Jim and Doug Wilson, the members of this team had played together since 1955. In 1960 the Black Watch team travelled to England to play the English national team, which had just won the "B" class world championship.

The English team consisted mainly of expatriate Canadians pursuing a hockey career abroad. More than 12,000 spectators watched the game in London's Wembley Stadium. Programs sold at the gate proclaimed "Canada vs England" in large, bold letters; an introduction which put a great deal of pressure on what was simply a regimental hockey team. Although the second period ended in a 5 — 5 tie, the English team won 10 — 5.

Maj Bob MacDonald, manager of the Black Watch team at the time, still maintains that his team should have won.

"We were beaten more by poor ice conditions than by the superiority of the English team," he said. "There was almost half an inch of water on the ice during the third period. We weren't used to those conditions, but they didn't seem to hamper the English team in the least."

#### BACK IN CANADA

Meanwhile, hockey was still enjoying great popularity back home. In 1958, a six team league was created in the Ottawa area, representing RCAF stations Rockcliffe and Uplands, Air Force Headquarters, Army Headquarters, the Navy and the RCMP.



Frank Oatway lets one fly past the opposition goaltender during a game between the 3 Wing Flyers and the United States national team in 1958.



Above. One of the RCAF Flyers prepares to move up the ice during an Olympic game against the Swedish national team. Below. One of the powerful teams of the 1960s — The Black Watch regimental team.

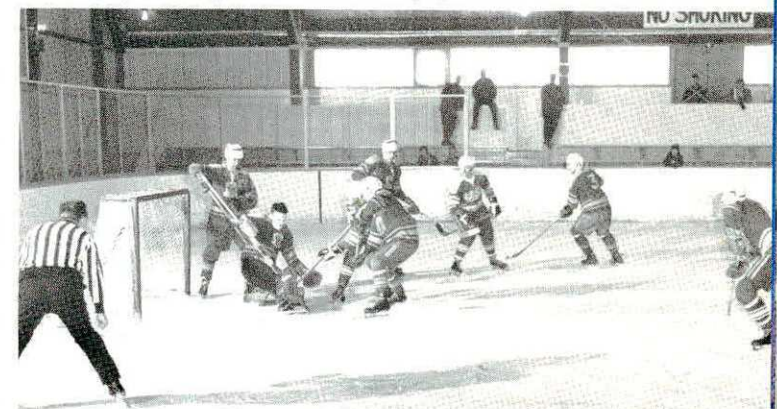


## HOCKEY SITREP 1978

	HAS A HOCKEY TEAM	LEAGUE PLAYED	HAS AN INTER-UNIT LEAGUE	TAKES PART IN THE REGIONAL HOCKEY CHAMPIONSHIP	LAST SEASON TEAM PLAYED	REASONS FOR DISBANDMENT
GERMANY	Yes	Exhibition games.	Yes	Yes		
BAGOTVILLE	Yes	Civilian intermediate league	Yes	Yes		
BORDEN	Yes	Exhibition games.	Yes	Yes		
CALGARY	No		Yes	Yes. Will send inter-unit champions	1973-74	Shortage of personnel. Too costly. No arena on the Base
CHATHAM	Yes	Industrial league	Yes	Yes		
CHILIWACK	Yes	Civilian league	Yes	Yes		
COLD LAKE	Yes	Civilian intermediate "C" league	Yes	Yes		
COMOX	Yes	Exhibition games	Yes	Yes	1976-77	Players not available
CORNWALLIS	No		Yes	Yes. With best inter-unit league players	1976-77	Civilian League disbanded
EDMONTON	Yes	Industrial league	Yes	Yes		
ESQUIMALT	No		Yes	Yes	1974-75	Scarcity of good players
GAGETOWN	Yes	Exhibition games	Yes	Yes		
KENWOOD	Yes	Civilian league	Yes	Yes		
HALIFAX	Yes	Civilian and military leagues.	Yes	Yes		
KINGSTON	Yes	Exhibition games	Yes			
LONDON	No		Yes	No	1972-73	Players not available. No arena. Too costly.
MONTREAL	Yes	Will play exhibition games	Yes	Yes	1975-76	Poor planning.
MOOSE JAW	Yes	Civilian league	Yes	Yes		
NORTH BAY	No		Yes	Undecided	1975-76	No arena. Too costly.
OTTAWA	Yes	Civilian league	Yes	Yes		
PENHOLD	Yes	Civilian league	No	Yes		
PETAWAWA	No		Yes	Undecided	1975-76	Players not available
PORTAGE LA PRAIRIE	Yes	Exhibition games	Yes	Yes	1972-73	Lack of interest among the players
NATIONAL DEFENCE HQ	No	None	Yes	Undecided	1976-77	Scarcity of players
PARWATER	Yes	Civilian league	Yes	Yes		
SHILO	Yes	Civilian intermediate "B" league	Yes	Yes		
SAINT JEAN	Yes	Practises only.	Yes	Undecided	1973-74	Lack of unit support
SUMMERSIDE	Yes	Exhibition games	Yes	Yes	1975-76	Lack of personnel to look after it
TORONTO	Yes	Civilian intermediate "C" league	Yes	Yes		
TRENTON	No		Yes	Undecided	1974-75	Players not available
VALCARTIER	Yes	Practises only	Yes	Yes	1974-75	Players not available
WINNIPEG	Yes	Exhibition games	Yes	Yes	1972-73	No arena. Too costly. Civilian league disbanded.



Above. The jubilant Flyers after their 1948 Olympic win.



Above. The Cold Lake Packers show the style that helped them win the 1970 and 1972 national championships. Below. Jack Roussel shows his enthusiasm to teammate Jim Gebhardt after the Baden-Soellingen Raiders won the 1972 International Cup.





At the end of the 1960-61 season, a team of league all-stars skated away with the Citizen Shield at the Ottawa Valley intermediate championship.

The RCAF Globetrotters from Trenton also made their mark on Ontario hockey. This team, which included old friends Orval Gravelle and Jim Gebhardt, won the Ontario intermediate "A" championship in 1961 and 1962.

In 1963, Gravelle was posted to RCAF Station Summerside, where, together with Tony Licari (one of the best centres in the Canadian Forces), he was largely responsible for the famous reign of the Eagles.

In the 1964-65 season, the Eagles won championships in two leagues; a civilian senior league and a military league that included teams from Shearwater, Halifax, Greenwood, Dartmouth, and Summerside.

The Eagles also played in the Allan Cup series, but their hopes were short-lived. They were eliminated by a senior team from Moncton, N.B.

In 1965, while the Eagles were still on top, a long-sought exhibition game was organized at Valcartier between the R22eR and the Black Watch, then stationed at Gagetown. The Black Watch won by a score of 6 — 3, ending a debate that had gone on between the soldiers of the two regiments for several years.

The Black Watch team reached its peak in 1965. The following season it was eliminated in the seventh and last game of the Southern New Brunswick Hockey League by a Fredericton team, which went on to win the Canadian intermediate "B" championship.

In 1965, the Canadian Forces hockey teams in Europe were growing stronger again. In the Air Division Hockey League, the 3 Wing Flyers were enjoying considerable success with players such as Marcel Lamouche, Denny Carpenter, Frank Oatway and Wayne Mitchell, a young recruit who would soon prove to be one of the best stick handlers in the Forces.

In northern Germany, the still active 4 Brigade Hockey League boasted a number of strong teams, including a powerful R22eR line up coached by WO Sam Saumier.

In 1967-68, the 4 Wing Raiders, coached by Tony Licari, were at the top of the Air Division league. Players such as Dave Carlyle, Réal Francoeur, "Jack" Gilbert and Yves Garand showed considerable talent.

Despite their strength, administrative difficulties prevented the Raiders from taking part in the first Canadian Forces hockey championship in Petawawa in

1968. CFB Chilliwack won that year.

Base closures in Europe during the late 60s led to the demise of the Air Division league.

To fill the gap, the commander of CFB Europe asked Major (now Lieutenant Colonel) Ray Boucher to examine the possibility of forming a European league. The result was the International Cup, top prize for a league consisting of four Dutch, two French and two Canadian teams (representing Baden-Soellingen and Lahr). Belgian, German and American teams joined the league in following years.

In 1971-72, Canada entered a team made up of the best players from the two detachments at Lahr and Baden-Soellingen. The Canadian entry won the league championship. But the composite team, remembered as one of the strongest of the decade, was barred from the Canadian Forces National Championship in 1972 because its players were considered to be drawn from two bases.

Canada was last represented in International Cup competition in 1972. The Canadian bases in northern Germany were closed. The service population moved south to Lahr and Baden-Soellingen in 1970, where a new military league — the Canadian Forces Europe Senior Hockey League — was formed.

#### THE CANADIAN FORCES NATIONAL CHAMPIONSHIP

The National Championship has been an annual event since 1968, with the exception of 1975 (when it was cancelled because of budget restrictions).

By 1977, six teams represented the Maritimes, Quebec, Ontario, the Prairies and the Pacific region. Chilliwack won the first championship, the Europe Selects won three times, the Cold Lake Packers twice, the Ottawa Falcons twice, and the Chatham Golden Hawks once.

CFB Shearwater held the championship from March 28 to April 1 this year, and the CFB Chatham Golden Hawks emerged victorious.

Although the National Championship filled a gap left empty for too long, the heyday of Forces hockey has ended, according to those who have followed the sport over the years.

Some blame a decline in the calibre of play on the Forces' reduction in strength. A few, such as Frank Oatway, say National Hockey League expansion teams have lured away young players who have preferred to try their luck in professional hockey, rather than join the Forces.

Others blame the attitude of today's young servicemen, who despite their talent, are no longer willing to subject themselves to rigorous training.

"Better paid recruits don't join hockey teams for the opportunity to travel inexpensively like they used to," says Captain Jack Gilbert, who played organized hockey in the Forces for many years.

Fortunately, this story doesn't have to end on a bleak note. Hockey is still a popular game in the Canadian Forces. Most bases can muster a team able enough to play in high-calibre civilian leagues; a good indication that there are still plenty of lively chapters to add to the history of Canadian military hockey.

The Summerside Eagles dominated both a military and a civilian league during the 1960s.



**sentinel**

## SPANNING THE EAGLE

### The Bridge that Winter Built

Up where the cold really begins, Canadian Forces engineers have built a 100 metre single span bridge. It stands as a monument to man's ingenuity in overcoming tough environmental problems found nowhere else.

It is the Eagle River Bridge on the Dempster Highway in the Yukon, completed and opened to traffic last year a month ahead of schedule.

The single span through truss bridge at mile 237 of the Dempster is the last major river crossing along the highway which eventually will stretch from the Arctic Ocean north of Inuvik, N.W.T. to Dawson City in the Yukon and on to Whitehorse.

Only 16 km south of the Arctic Circle, where it can get cold enough for a hammer blow to shatter steel, the weather was both a boon and bane to the engineers.

Under the direction of Capt. Steve Irwin, the project commander drawn from 1 Combat Engineer Regiment, CFB Chilliwack, the bridge was constructed for the Department of Indian and Northern Affairs.

The highway, dubbed the "road to resources", may well become the eventual route for the Dempster pipeline, which will connect with the Alaska pipeline to tap the resources of Arctic gas and oil.

The Eagle River Bridge is the second built on the Dempster by CF engineers. They also built the George A. Jeckel Bridge over the Ogilvie River at mile 123 in 1971.

The \$2.6 million Eagle River Bridge contract required an unusual kind of expertise. Consider the problems; long hauls over gravel roads, miles from any supply sources; perma-frost on one



Story by Doug Stuebing

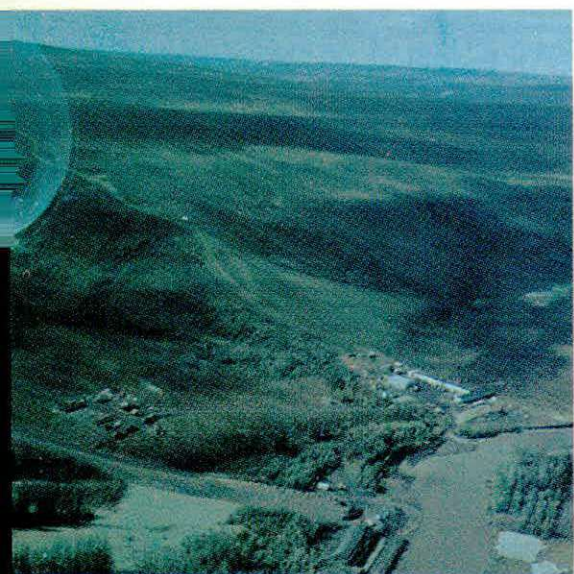
Photos by MWO Wilf Spellmier and M/Cpl Stan Coe

1978/2





Above. Sapper Mike Gardiner hangs by his safety belt to torque nuts. (REC 77-204) Middle. The bridge site in the summer of 1976 (REC 76-116). Below. Freeze-up has provided the foundation for other false work, on which the first steel is being laid. (REC 77-116)



bank and not on the other; a frozen river which had to be frozen deeper to support the bridge building; and short daylight working hours on high steel in sub-zero temperatures.

Who would want it? Hardly anybody, really. So the challenging job went to 1 CER with support from 1 Canadian Brigade Group, 1 Construction Engineering Unit, Winnipeg, and the Director Military Engineering Operations at National Defence Headquarters.

In the end it came down to 26-year-old Capt. Irwin and the 157 people who worked for him.

The operation got underway in July, 1976, when the men in the first of five shifts that would rotate through in a year pitched their tents at Eagle River. Then came the back-breaking work of building 810 massive wire baskets, into which almost 360 tons of rock had to be hand-laid, and placed along the river bank as shoring to prevent spring wash-outs.

In October of that year, Warrant Officer Ralph "Reb" McKinnon and six other sappers travelled to the Hamilton, Ontario yards of the Bridge and Tank

Company. There they assembled half of the bridge in 10 days, for instructional training. Then they dismantled it and packed it for shipping.

More than 350 tons of steel, including 11,327 nuts and bolts, made the journey across Canada by train, boat and truck from Hamilton to the Eagle River.

It was a long, dusty 900 km haul over the Dempster from Whitehorse to the bridge site; but all the material was trucked in during the short summer season.

The abutments, embankments and cement pourings were completed during good summer weather. But it was winter which proved both a help and a hindrance to construction.

Capt Irwin had calculated that the nature of the river bed required strong winter ice to support the false work needed to build the span. He calculated that 152 cm of ice would provide safe support.

Freeze-up brought him half of that, and flooding by sappers provided the other 76 cm. The false timber work which would support the steel was then built on top of the ice.

"We had to have the cold weather because we could only build the bridge on the ice," Capt. Irwin said. "We couldn't put in a centre support due to the silty river bottom and because the ice break-up would take the support out. So it had to be a single span bridge."

Day after day the engineers flooded the ice, further strengthening it with steel mesh and criss-crossed timbers.

Large wooden support piers were built near the site and erected on the ice. Then the steel was placed on the piers, and the bridge began to take shape.

The weather also inhibited the work. Master Corporal Lou Bryson recalled one day "when it was so cold, a half-inch steel rod just shattered when it was pounded with a sledge hammer".

The temperatures were extreme. One day minus 60 degrees Celsius was recorded.

Sgt. Jim "Flipper" Fitzgerald took his men out in minus 52 degree weather, and they worked the entire shift.

Said Irwin, "We planned on 30 per cent downtime because of the weather, but we didn't need it."

On the high rigging, in the steel shattering cold, the men carried on with their work, straddling the narrow girders or hanging upside down in monkey positions. But in spite of the cold and the danger, there were no serious inju-

ries.

This is a remarkable record, considering that 157 men worked in excess of 13,000 man-days, much of them spent on structural steel 20 metres above the ice in temperatures that frequently fell to -40 degrees Celsius.

The most serious accident, requiring a few stitches, occurred during a broom-ball game, when Sapper Dave Johnson was decked by Lt. Duncan Watt's elbow.

Morale was unusually high in the confined environment of tents and then trailers, where men lived almost on top of each other. No small amount of credit for this must go to the cooks, under WO "Sourdough" Don Watt.

In "Sourdough's Happy Hash House" a sign read, "we specialize in French, German, Chinese, Japanese and Italian". Almost everyone had an environmental nickname, and the cooks were no exception. Such colourful characters as Klondike Hippy (MCpl Jerry Hipson), Ptarmigan Ron (MCpl Ron Rothermal), Cariboo Bill (Cpl Bill Mahoney), Matanuska André (Cpl André Baron), and Skookum Norm (Pte Norm Schubert) all helped in the food preparation, uninhibited by their nicknames.

The men had visitors, mainly caribou, wolves, bears, ravens and ptarmigans. MCpl Lou Bryson claimed, "I saw one herd of about 2,000 caribou, with about 10 wolves moving right through the centre of the herd."

"The wolves were bigger than any dogs you've ever seen . . . sleek and well fed . . . maybe 180 or 200 pounds each," he said.

They also had other guests. The largest party arrived in late February, 1977, headed by the Deputy Chief of the Defence Staff, MGen Kenneth Lewis. He was accompanied by Northern Region Commander, BGen Kenneth J. Thorneycroft; and several other senior officers.

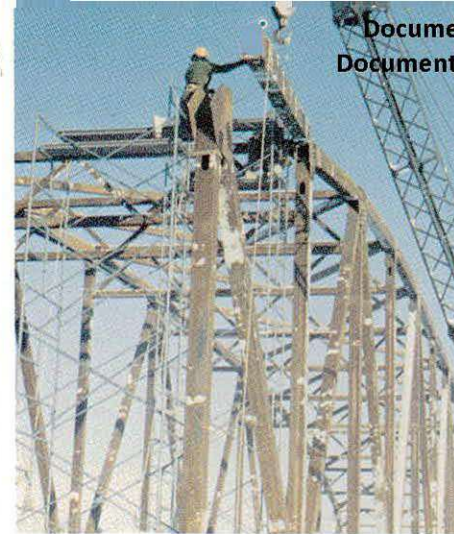
A complete visual record of the bridge building was filmed by members of the CF Photo Unit, under the direction of MWO Wilf Spellmier. The finished 30-minute movie is entitled "Wings Across the Eagle".

A shorter, three-minute version was produced for TV, and distributed to about 100 television stations across Canada.

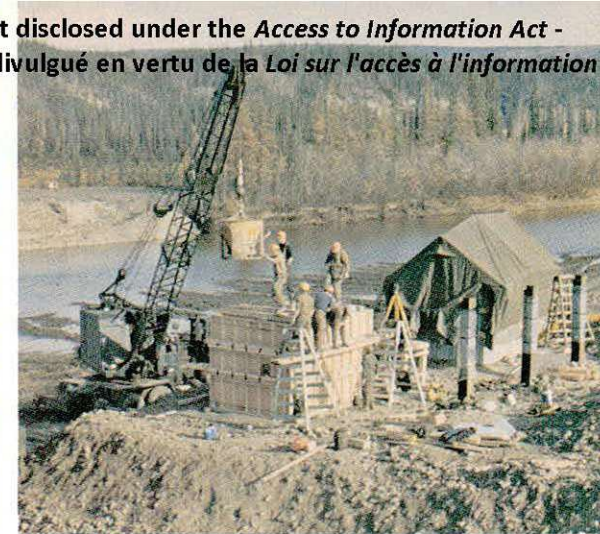
The Eagle River Bridge was a major achievement for the sappers, and one in which they can take justifiable pride.

Said Warrant Officer "Reb" McKinnon, "The men really put their hearts into this."

"It's their bridge."



A sapper guides a major section into position. (REC 77-208)



Pouring concrete for a main pile cap. (REC 76-864)



Above. Maj B.E. Crow, CO 3 Fd Engr Sqn presents a plaque to DCDS MGen K.E. Lewis in Feb 77. (REC 77-208) Below. The engineers work to place the final pieces before spring thaw. (CWC 77-467)







.....delete M\*A\*S\*H



.....insert M\*U\*S\*T



by Lt. Wendy Tighe

Collectors of military acronyms — prepare to add another to your already strained vocabularies. Delete M\*A\*S\*H, insert M\*U\*S\*T.

The "Medical Unit, Self-contained Transportable", the inflatable field hospital that pops out of 27 containers, inflates in hours and accommodates 100 patients has arrived. The Canadian Forces recently purchased one complete MUST and assigned it to the 1st Canadian Field Hospital at CFB Petawawa.

The \$3.5 million unit, developed in the United States for the American Army, rose above the Petawawa landscape for the first time last fall, providing the medical staff of the 1st Cdn Field Hospital with an opportunity to work in their new environment.

In scenes reminiscent of M\*A\*S\*H, the popular American movie that spawned a television series, simulated casualties arrived by helicopter swaddled in army blankets. Doctors, nurses and medics dressed in combat clothes worked amongst the wounded, tending their "battle injuries" in eight aluminum operating and x-ray rooms, and making them comfortable in 11 rubberized wards.

It's difficult to discuss a field hospital without making reference to the famous MASH unit, even though that veteran of the Second World War and the Korean conflict is a generation removed from MUST. Exit the labyrinthine arrangement of canvas tents, and enter aluminum-faced styrofoam honeycomb panels, synthetic rubber-coated Dacron, hot and cold running water, and a constant indoor temperature of 22 degrees Celsius, whether it's 55°C below or 50°C above outside.

In an emergency, MUST can accommodate up to 200 patients. Last fall, a total of 224 simulated casualties were treated within a 48-hour period by a medical staff brought together from across the country for MUST's first Canadian trial.

Under the command of Major B. Edgecomb, 1 Cdn Field Hospital consists of a permanent cadre of 28 medical personnel stationed at Petawawa. Another 150 or so augmentees are drawn from bases from Halifax to Esquimalt to operate the hospital.

Top left. A simulated casualty arrives by helicopter. Middle. The same type of field hospital that housed Canadian wounded during the Second World War and Korean conflict deployed on exercise in 1969. Bottom. The tented field hospital's 1977 replacement.

**sentinel**



Ease of assembly is the keyword with MUST. An experienced crew can off load and assemble a compartment and connect air, water and electrical lines in less than 30 minutes.

Maj. Edgecomb pronounced the MUST unit's first shakedown a great success. Morale was high among the staff who worked within its confines, and the hospital structure itself met expectations, he said.

The new hospital is composed of both inflatable and expandable elements. Each 25-bed ward (there are four) is made of inflatable double-walled rubberized dacron. Six utility packs keep the walls of the wards inflated, and also provide heat, hot water, air conditioning and ventilation.

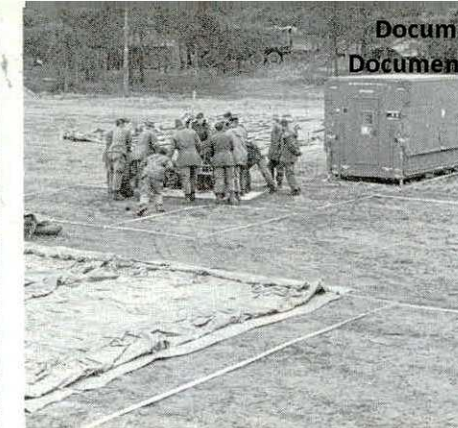
A system of air chambers within each compartment allows the hospital to sustain a fair amount of damage before it collapses. In Vietnam an American MUST unit withstood 100 shrapnel hits with no interruption to medical activities.

Each expandable unit is constructed of rigid panels, which stretch like an accordion to three times the size of its container. With practice, a four-man crew can assemble a unit in less than 30 minutes and connect it with electrical cables, water and air ducts. Each multi-purpose expandable unit can serve as an operating room, sterilization room, pharmacy, laboratory, dental clinic or x-ray room.

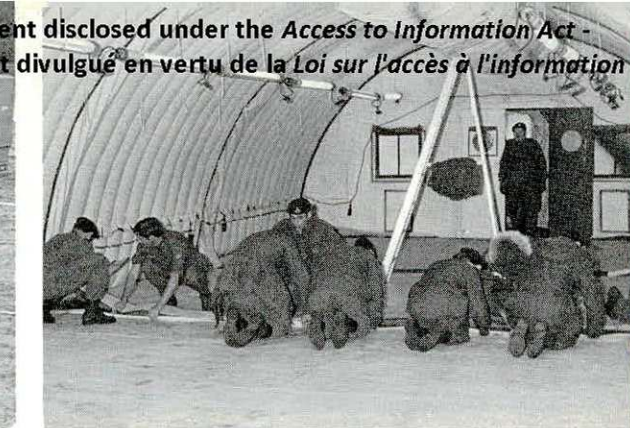
The Petawawa medical exercise demonstrated MUST's many advantages under operational conditions. But the methods used to transport MUST are also an important factor in the hospital's evaluation.

One of the MUST concept's main aims to fame is its transportability. The entire hospital can be packed in 27 containers, measuring 2.4 m x 1.2 m x 3.7 m, each weighing from two to five tons. Then it simply becomes a matter of loading the containers onto ships, into aircraft or onto land vehicles for transport. In special cases, the units can be slung beneath helicopters or even hauled along on snow sleds.

The end result is a modern hospital which can provide prompt aid to members of the Canadian Forces, no matter where they serve.



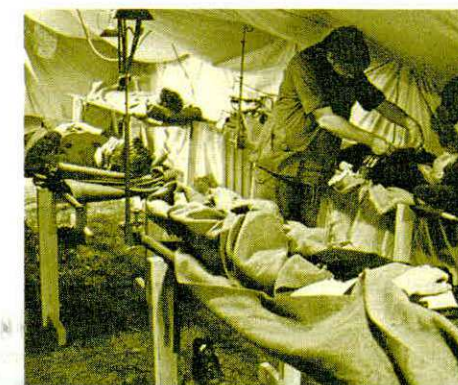
Document disclosed under the Access to Information Act -  
Document divulgué en vertu de la Loi sur l'accès à l'information



The hospital can be put into operation within less than 24 hours, providing sophisticated medical treatment for 100 patients housed in four rubberized wards.



Defence Minister Barney Danson observed the medical team at work during MUST's first field trial.



Above. Tented field hospitals often had no floors.



Right. Today, casualties can be treated in a climate controlled environment.



## books



**The Business of Tanks** by G. MacLeod Ross. 340 pp. Illustrated. Published by Arthur H. Stockwell Ltd., Elms Court, Ilfracombe, Devon, England. Available in Canada through B.O.T., P.O. Box 461, Goderich, Ont., N7A 4C7. (Cheques payable to B.O.T.). \$12.00

Anyone who has studied the history of armour has no doubt wondered what the British tank designers were doing in the early stages of the Second World War, when they were designing inadequate tanks with pop-gun-like two-pounder barrels while the Germans and Russians were producing superb fighting machines.

Other writers have attempted to explain this anomaly with reasons that are not totally plausible. However, the author of *The Business of Tanks* was at the vortex of the British tank design organization during the 1930s, and without mincing words he gives the inside story. The internecine quarrels, petty red tape, and narrowness of vision that dominated the tank design organization were no doubt as depressing to experience then as they are to read about 40 years later.

In 1942, Colonel (and later Brig.-Gen.) Ross was assigned to the British liaison mission to the U.S. Army Ordnance Corps operation in Detroit, where the American automotive industry was gearing up to produce the thousands of Sherman tanks that would be omnipresent in the Allied armies during the latter half of the Second World War. The author is full of praise for the dedication and efficiency of the American automotive industry during that critical period.

The American effort was not without its problems, however. The most serious of these was the lack of a sufficiently powerful gun on the Sherman. The British finally resolved their internal difficulties and came up with their excellent 17-pounder gun to be mounted on the Sherman. Here, the author's vitriol turns towards the U.S. Army Ordnance Corps, which he claims ignored the gun merely because it was not American. He also claims that the Corps was so involved with the idea of a totally new follow-on tank to the Sherman that it ignored the U.S. Army's pleas to quality-improve the existing tank. The end result was that neither was produced in time to influence the war.

Unfortunately, the book is very poorly edited, and rambles frequently. It is therefore not for the layman. But for anyone interested in the history of armour, it provides an invaluable insight to one of the least understood periods of that history.

I closed the book thinking about another matter. As NATO moves towards its next

generation of armoured fighting vehicles, I sincerely hope that such internal and international rivalries are being overcome for the betterment of the NATO whole . . . Maj. W.R. Aikman

**The Big Bombers of World War I** by Lt. Hugh B. Monaghan, R.F.C. published privately in Memoriam by Ray Gentle Communications Ltd., Burlington, Ont. Paperback, 101 pages, some photos.

"The Big Bombers of World War I" is a somewhat misleading title to a narrative which one is tempted to call a "rollicking good yarn", though, certainly, it is much more than that.

Born in Deseronto, Ontario in 1894, Hugh Monaghan's account of his service with an overseas infantry battalion and the R.F.C. during W.W. I will surely capture the interest of a wide range of readers, especially aviation buffs.

Mr. Monaghan uses an easy flowing style to describe his life and training in Britain, prior to embarkation for France to serve in the Royal Flying Corps, where he flew first as a gun-layer, then later as a pilot of a Handley Page bomber aircraft. The gripping account of the primitive way in which war was waged from the air, in the "early" days, will astound many, especially younger readers.

Including an interesting account of life in a prisoner-of-war camp and subsequent rehabilitation, *Big Bombers of World War I* is more than a collection of anecdotes and incidents related to World War I; it is an unusual story of one Canadian's war . . . Lt. C.G. Wragg (LR)

**Poor Bloody Infantry**, by W.H.A. Groom. Published by William Kimber and Co. Ltd., London England. Hard cover, 179 pp., illustrated. Available in Canada from Clarke, Irwin, & Co. Ltd., 791 St. Clair Ave. W., Toronto, Ont. M6C 1B8. \$11.25

The author of this book is a veteran of the trenches of the First World War. Specifically, he was a private and later a lance-corporal in a Lewis gun section in a British regiment until he was gassed in May, 1918. He points out that most histories of the war were written either by people who weren't there, or by officers, and he claims that the result is a glossing over of the misery of the common soldier - the PBI - who lived in the hell of the front lines. This has spurred him to tell that story.

The result is a very moving narrative, relating the experiences of young men caught up in a war machine that they could not influ-

ence, and which repeatedly sent them forward under incredible circumstances to their death. He makes it clear that for the private soldier, the sole motivation was survival, as much against "the system" as the enemy. The private soldier spent his life feeling that he was totally expendable, and that his commanders were more interested in "offensive spirit" than in saving lives. It made for deep bitterness and cynicism among all soldiers, which of course showed itself in the attitudes of the common people of many nations through the decades following 1914-18.

I cannot agree with the author that all accounts of the first World War gloss over the misery of the front line soldier. In the past few decades there have been a large number of works which have emphasized that point of view. However, his report from the perspective of an intelligent and articulate private does add a new dimension. And one can find much food for thought in his concluding chapter, which condemns the present-day repetition of the world-wide arms race, and calls for love and understanding amongst us all . . . Capt. W.R. Aikman.

**After the Battle**, a quarterly magazine published by Battle of Britain Prints International Ltd., 3 New Plaistow Rd., Stratford, London, England E15 3RA. Available in Canada through Beadmore Enterprises, 2439 Eglinton Ave. E., Scarborough, Ont. M1K 5B8. Back copies \$2.75 each, annual subscription \$10.95.

*Sentinel* does not normally review magazines, but we feel that our readers should be aware of this one.

*After the Battle* is a quarterly magazine which returns the reader to the scene of at least one major battle of the Second World War per issue. The magazine consists of a summary of the battle, plus a careful detailing of the locations of major actions through the use of maps and then and now photographs. Great efforts have been made to relocate the scenes of famous photographs of the battles.

The result is an interesting tour of the battle area for the armchair military history buff, and an invaluable aid for those who wish to walk the sites of famous battles.

As of February, 1978, 19 issues of the magazine have been produced, containing studies of battles such as Normandy, Arnhem, Dunkirk, the Bulge, and (of special interest to Canadians) Dieppe and the Falaise Pocket. If you write for a subscription, be sure to ask for the brochure on back issues.

This magazine is highly recommended . . . Maj. W.R. Aikman

## letters

### BATTLE OF HAMBURG

I am writing a book about the four heavy raids carried out by R.A.F. Bomber Command against the German city of Hamburg at the end of July and in early August 1943. I know that many Canadian airmen took part in these raids and I am anxious to include their experiences in the book.

If any of your readers flew on these raids and would be willing to help, could they please write to me giving their name and address, their squadron at that time and their aircraft captain's name. I will then give them more details about the type of information I am seeking.

Martin Middlebrook  
48 Linden Way  
Boston  
Lincs. PE21 9DS  
England

### WELL-EARNED CREDIT

I read with interest the article in *Sentinel* 77/2 on the 1977 Ottawa marathon. However, I was disappointed to discover that my name was not mentioned. I was very happy to come in third in the CF part of the competition, with a time of 2:50:23.

L.N. Doe (Cpl)  
CFS Barrington  
Stone Horse  
Nova Scotia

(We're sorry that Cpl Doe did not receive a mention in the article. We listed the first and second place winners, plus the winner of the "over 40" division. Cpl Doe did place third, but limited space prevented us from mentioning either him or the remainder of the CF runners who pounded along more than 26 miles of Ottawa's streets to complete the marathon. They certainly deserve credit . . . Editor)

### CANCEL LA DIFFERENCE

I must say your answer in the Letters column of *Sentinel* 77/3 to the query about the girl on the cover of the *Sentinel* Olympic issue is typical of the attitude of nearly all male personnel involved in the Games. Did you forget that there were

over a hundred female personnel there, doing a difficult job? Or did you feel that we were best ignored and treated as second-class citizens? Yes, we were there, and although our role was minor, we did a very good job wherever we were employed. Perhaps few of us could win a modelling contest (especially in our work dress), but I didn't realise that appearance was more important than ability, cooperation and a good attitude towards the job.

My memories of the Olympics are not very pleasant or inspiring; the only good thing about it was meeting foreign athletes and being at the "sharp end" for a change.

When I read something as frustrating and insulting as the reasons and attitudes behind the *Sentinel* coverage of the Games, I begin to wonder if perhaps such a popular publication needs a change of staff. Personnel across the country read the *Sentinel*, regular force and reserves, as well as our forces in Europe; if it presents such a "put down" attitude towards service women, it could do more harm than good to the status and treatment of women in the Forces.

Maureen James, Cpl (W)  
DPCOR/LORE  
NDHQ  
Ottawa, Ont

(Methinks we struck a nerve.)

But we feel you missed the point. The young lady's photograph was not intended as any kind of commentary on CF women.

In addition, we take issue with your comments on *Sentinel's* assessment of the role of CF women at the Games. *Sentinel* was very much aware of the contribution of CF women (not only the members of the security detachment at the Olympic Village, but also those who served with the COJO Support Group), and reflected this throughout the magazine.

For example, that same cover has photographs of both CF men and women at the Games. A quick check inside the magazine indicates that 14 of the photographs included a total of 17 CF servicewomen. In addition, the activities of the 100 women with Task Force 1 were described in the article on that organization.

We now fear another problem. When the 15,000-plus men who served at the Olympics discover that such a sizable pro-

portion of CF women were pictured in *Sentinel*, perhaps we'll be deluged with complaints of an anti-male bias . . . editor).

### 426 SQN REUNION

426 (Thunderbird) Squadron will be receiving its Colours in August 1978. In addition to the actual presentation, 426 Squadron and the 426 Wartime Reunion Committee are planning a squadron reunion. Celebrations will take place at CFB Trenton, Ontario on the weekend of August 19-20, 1978. All former Thunderbirds, both service and retired, are cordially invited to attend.

Anyone who answered our request for historical material a year ago is already on the mailing list, and will receive a registration form shortly. All other ex-Thunderbirds please write:

Major Noel Funge  
Executive Co-ordinator  
426 (T) Training Squadron  
Canadian Forces Base Trenton  
Astra, Ontario  
K0K 1B0

### PPCLI RECORD AVAILABLE

The recording entitled "Princess Patricia's Canadian Light Infantry Band Salutes the Diamond Jubilee of the Regiment - 1974" is once again available, after having been out of stock for two years.

As before, it is available only through Regimental Headquarters of Princess Patricia's Canadian Light Infantry, Currie Barracks, Calgary, Alta., Canada, T3E 1T8 at a cost of \$6 (postage not included).

L.P. Barbeau  
Regimental Major  
Regimental Headquarters  
Princess Patricia's Canadian Light Infantry  
Currie Barracks  
Calgary, Alta.  
T3E 1T8

### HMCs WEYBURN PLAQUE UPDATE

(The following letter was mailed to Mr. Gillespie of the Snr NCO Reserve Mess in Kingston as a result of his letter published in *Sentinel* 77/3 . . . editor)

Dear Mr. Gillespie:

The photograph accompanying your letter in *Sentinel* 1977/3 represents one of 24 plaques made in HMC Dock-

yard, Halifax, and now in the Protestant chapel at CFB Halifax. The Base Chaplain (P) has confirmed that HMCS Weyburn's plaque is in its place. Evidently the one in Kingston is a duplicate. I am unable to suggest a likely place where it may have been erected except for Weyburn, Saskatchewan, or Victoria, B.C., LCdr Golby's home town. Incidentally, his name is misspelled on the plaque.

W.A.B. Douglas  
Director  
Directorate of History  
National Defence Headquarters  
Ottawa, Ontario  
K1A 0K2

### ROYALS CELEBRATE 95th

The Royal Canadian Regiment, Canada's senior regular force infantry unit, will be celebrating its 95th anniversary with a regimental reunion this year. This will be a major gathering of the regimental family, and will be held at Wolseley Barracks, London, Ontario from July 7th to 9th.

Program information and registration kits are available through the secretary, The Royal Canadian Regiment Association, Regimental Headquarters, Wolseley Hall, CFB London, London, Ontario, N5Y 4T7.

D.A. Stickland, Captain (ret'd)

Reunion Committee  
The RCR Association  
London, Ontario

## LETTERS

*Sentinel* welcomes letters. Correspondents should be brief and to the point and letters should be signed and bear a return address and postal code. We reserve the right to edit letters for taste and brevity.

Collectors letters are not accepted for publication due to lack of space. There are two organizations which can help collectors with their hobbies.

The Military Heraldry Society operates a collector's exchange and publishes four journals yearly. Annual subscription is \$3.00. The address is Military Heraldry Society, 37 Wolsey Close, Southall, Middlesex, England. UB2 4NQ

The Military Collector's Club of Canada has more than 600 members. Mailing address for the club is P.O. Box 56, Medicine Hat, Alta. T1A 7E5

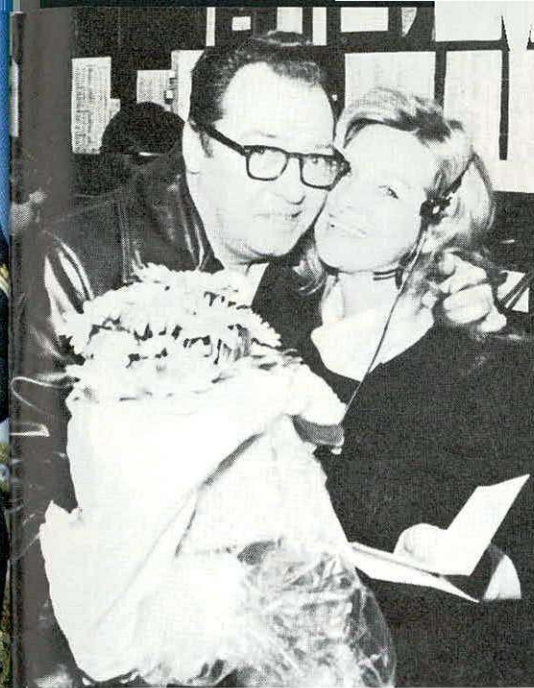




Above. A CH 113 Voyager of 413 Sqn, resplendent in new SAR colours and bilingual markings, lifts off at CFB Summerside. With the extension of Canadian territorial waters to 200 miles, DND is expanding its SAR Voyager/Labrador fleet. Four Voyagers drawn from reserve storage are being modified to Labrador standards with the installation of Omega navigation systems, auto-hover and weather search radar. (ISC 78-134)



Above. Three CF airmen representing NORAD's 22nd, 23rd and 24th Regions were among 16 American and Canadian NCOs selected as 1977 Outstanding Enlisted Personnel in the two-nation command. From left, Cpl Ernie Bremner, air defence tech; Sgt. Bob Hedley, clerk admin; and M/Cpl Jerry O'Brien, radar tech, with plaques awarded to them when they visited NORAD HQ at Colorado Springs. NCOs Bremner, Hedley and O'Brien serve at CFB North Bay, CFS Alsask, Sask. and CFS Lowther, Ont. respectively. (ISC 78-1001)



Maj Vic Keating, regional information officer in Edmonton, gave flowers and a hug to Charlene Dew of the base telephone exchange section. Base long distance operators placed calls all over North America so that Op Morning Light information could be passed on to world-wide news media.



The Blue Pine Construction Co. of Port McNeill, B.C. thought highly enough of Cpl Mickey Hargreaves' cooking to present him with a culinary award. Cpl Hargreaves, a cook at CFS Holberg received a trophy entitled "Culinary Award, Cuisine Par Excellence, Plat Gastronomique of the Year".



As part of the continuing CF Civil Artists Program (CAFCAP), Edmonton artist Meredith Evans spent four days at Camp Garland gathering his impressions for his paintings on Op Morning Light. His completed works will be turned over to DND and held on permanent display at the National War Museum in Ottawa. (OPML 025-6)

#### JUST PART OF THE JOB

A private pilot who lost his way above northern Vancouver Island last fall, owes a big chunk of his good fortune to two corporals at CFS Holberg.

Cpl Wayne Buan and Cpl Lee Morrison were on duty the night that the 25th NORAD Region Control Centre (RCC) at McChord US Air Force Base in Washington received a relayed distress call from the pilot of a single engine aircraft who was lost, low on fuel and battling bad weather.

The RCC called CFS Holberg in an effort to establish a firm radio relay. With the aid of Cpls Buan and Morrison and the pilots of two Alaskan airliners, the relay was arranged.

To ensure the worried pilot was getting the guidance he needed from the RCC, Cpl Buan suggested that he shut off his emergency squawk. When the pilot complied, RCC personnel were able to confirm he was receiving their radio instructions.

At the same time, Cpl Morrison kept the RCC up to date on the plane's position, using Holberg's heightfinder.

As a final precautionary measure, a search and rescue aircraft left from CFB Comox, but in the end was not required. The pilot landed safely in Port Hardy, B.C.

So hats off to the Canadian and American units of NORAD who proved, through their quick and able response, the high level of co-operation that exists in NORAD.



Above. Grace McCarthy, British Columbia's minister of tourism presented an official Captain Cook bicentennial flag to LCdr Robert Walker, centre, CO of HMCS Oriole, which will compete in the Hawaii to Victoria tall ships race in July. Rear-Admiral M.A. Martin and "Captain Cook" looked on. Below. A section of the 3rd Battalion, The Royal Canadian Regiment advances across a German Bridge during exercises last fall. The battalion, based on the now defunct 3 Mechanized Commando, was taking part in its first major exercises in Germany. (IL 77-691)



Above. HMCS Scotian in Halifax topped 17 other divisions last fall to win the Naval Reserve's annual award of excellence. Cdr Rowland Marshall, left, retiring CO of Scotian, accepted the award from Capt (N) C.G. Pratt, middle, director of Naval Reserves, with the help of the new CO, Cdr Bruce Waterfield. Below. Gen James E. Hill, new commander-in-chief of NORAD pinned on his fourth star last December at Peterson AFB near Colorado Springs. Taking part in the ceremony were (left to right) Mrs. Hill; retired USAF Gen Earl Partridge, first commander-in-chief of NORAD; Gen Hill; retired CF Air Marshal C. Roy Slemon, the first deputy commander; and CF LGen David Adamson, present deputy commander. Gen Hill took command from Gen Chappie James. Gen James died while on retirement leave in February. (NORAD photo)



#### RESERVES WITH REGULARS

The Militia has a Military Police Platoon that has demonstrated the potential of the "total force" concept. The platoon, part of the 28 (Ottawa) Service Battalion, has completely integrated with the local regular force MP units, and its 18 members carry out patrols alongside local regular force MPs.

Under the direction of Capt Don Tresham, the platoon members began the project over a year ago with a concentrated in-house training program, which ended with a series of tests by the regular force. With these hurdles overcome, the reservists began working with the regular force unit one day a week instead of their usual two nights a week with the Militia.

The Militia has clearly benefited from the program as well. Last March the 28 (Ottawa) Service Battalion MP platoon was judged the best reserve MP unit in Canada.

In August, the platoon provided total police and security services when more than 600 reservists gathered for two weeks of field training at CFB Petawawa. During the Militia's jubilee celebration in Toronto, 28 MP Platoon formed the core of an MP company that worked with city police to handle a crowd of 20,000.

In November, the NDHQ Military Police Unit recognized the reservists' work by presenting them with framed photographs of the security branch badge and flag, and the Canadian Forces School of Intelligence and Security badge, bearing the Queen's signature.





Above. The uniforms may not be authentic, but the young men wearing them are real servicemen. Pte. J.A. Demarais top, and Pte Bernard Leduc volunteered to work as extras in Montreal last fall, during the filming of Hugh MacLennan's novel *Two Solitudes*. Pte Demarais and Leduc were English language students at CFB St. Jean at the time.

## SOUNDS OF WAR

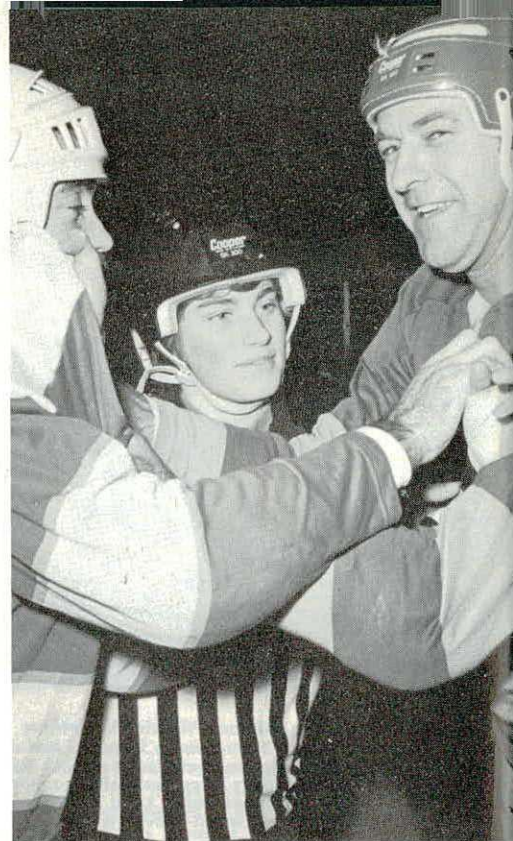
Visitors to Great Britain's Imperial War Museum can listen to military history as well as observe it. The museum recently opened its sound archives to the public.

The museum has approximately 3,500 hours of recorded material. The recordings include Second World War BBC news reports, actualities, interviews and personal narratives made during, or immediately after, the events they describe. In addition, there are a large number of recordings of veterans relating their experiences from the First World War.

In a less complete state of organization are recordings used as the basis for several BBC television series on the world wars, various speeches by Nazi leaders, recordings of the Nuremberg trials and other military subjects, such as the British Army in India.

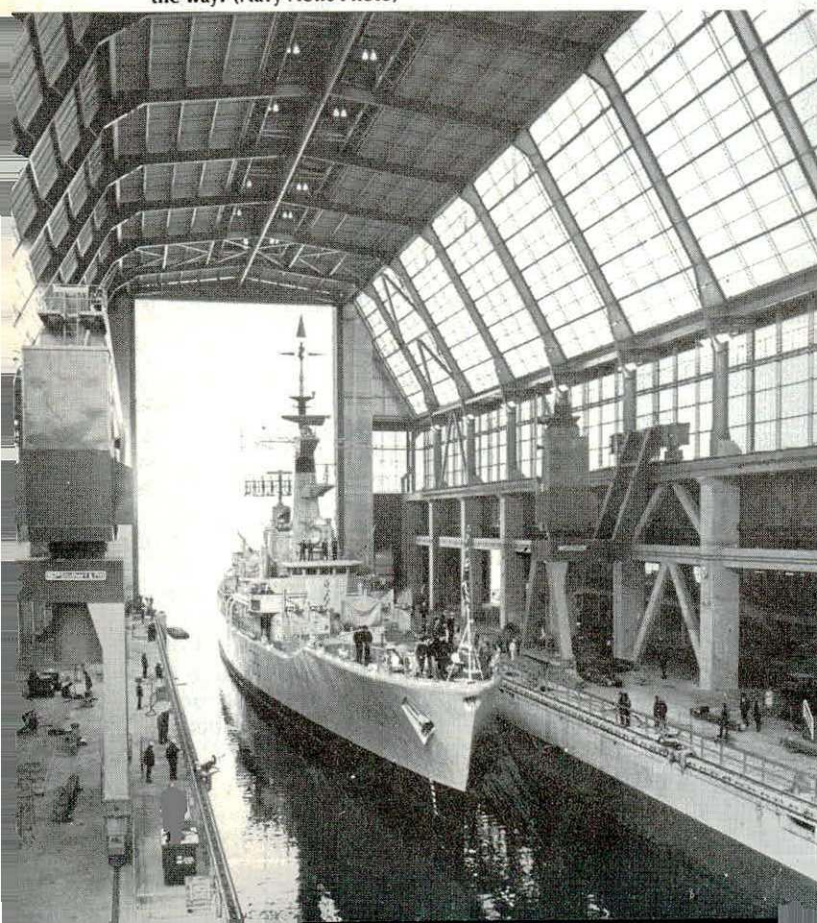
Visitors to the museum can listen to the recordings in special facilities, and copies of some of the recordings are available for purchase.

Enquiries should be addressed to the Department of Sound Records, Imperial War Museum, Lambeth Road, London SE1 6HZ, England.



Above. Who's the lady in the hockey referee's shirt you ask? She's Pte Alison Clarke, an admin clerk at Air Command Headquarters in Winnipeg. She's also a referee for the Inter-Section Men's Hockey League at CFB Winnipeg. Pte Clarke became the first woman to qualify as a referee in the Ontario Minor Hockey Association in Bramalea, Ont. two years ago.

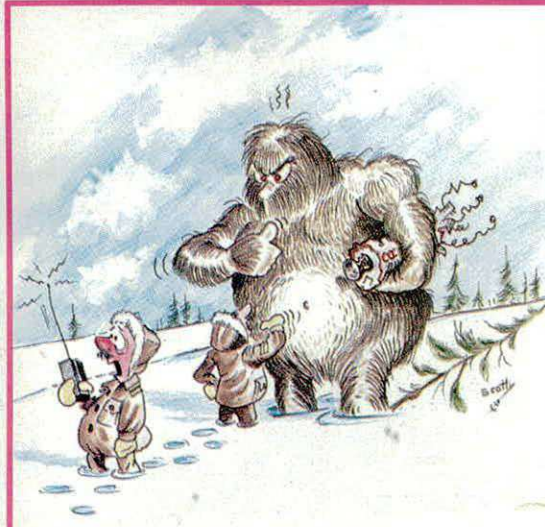
Below. The Royal Navy's dockyard operations have moved indoors in Devonport, England, where three under-cover drydocks can service a trio of frigates simultaneously. Built at a cost of £18 million, the new complex features a 131-foot door clearance which allows ships to enter with masts and aerial arrays intact. Dockyard workers no longer have to contend with poor weather; but they do have to put up with high flying birds, who, finding it cozier inside than out, litter ships decks and anyone who gets in the way. (Navy News Photo)



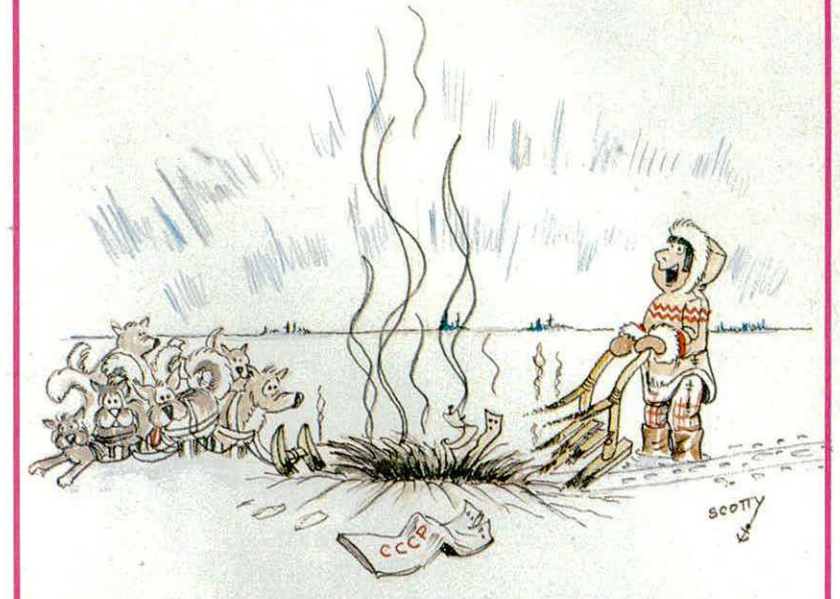
Exercise Prevailing Chill lived up to its name in January when Petawawa's Special Services Force joined Britain's Queens Royal Irish Hussars for a week of manoeuvres in the Gatineau Hills of Quebec. Above. 8 CH Ferret Scout cars receive a final tarpaulin check at the end of the day. Below. British troops help cover a Canadian APC with snow camouflage.



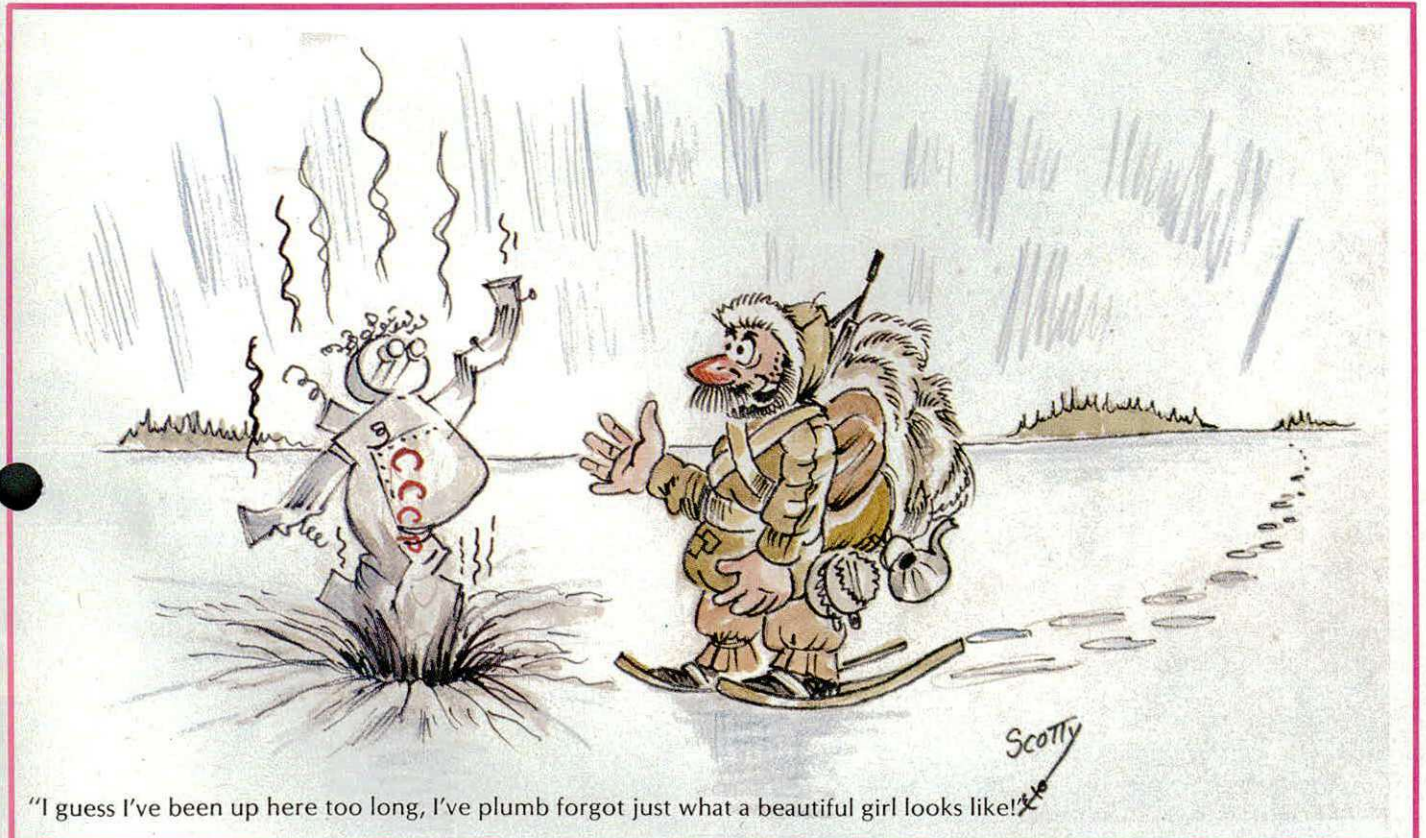
## Scotty



"Hello! Control, we've just located the satellite, but we have a slight problem with recovery!"



"Who do I sue?!"



"I guess I've been up here too long, I've plumb forgot just what a beautiful girl looks like!"



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# Tutor Overview

Precision formation flying is not the sole preserve of the CF Snowbirds team as members of 2 Flying Training School, "the best in the west", based at Moose Jaw demonstrate. 32 of the school's silver Tutors flew over Saskatchewan for this picture, taken by Lt Dick Bos flying above in another Tutor. Lt Bos, an exchange pilot from the Royal Netherlands Air Force, instructs at 2 FTS.

**sentinel**

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