

*date:* Friday, January 24, 2003

*to:* Laboratory ESH Committee Members

*from:* E. T. Lessard

*subject:* Change of an Operational Safety Limit (OSL) at C-AD

## Memo

The current C-AD procedure OPM 2.5, "Operational Safety Limits/Accelerator Safety Envelope for AGS, Booster and Linac," which has served since August 1995 as the DOE approved Accelerator Safety Envelope, is too restrictive. The proposed change shown in the attachments allows a short interval, up to 80 hours, of approved inoperability of the installed fire detection and fire suppression systems, as long as there are other equivalent indications to warn of equipment overheating or a fire.

The reason for this change is to allow important machine operations or experiments to continue operating after management's approval to accept the small risk of fire during a short interval. The C-AD on-duty Operations Coordinator may allow operations to continue up to two hours to allow time to contact the Department Chair or designee, who in turn may authorize continuing beam operations up to another 80 hours. If the system is not restored at the end of this interval, the machine must be shutdown and the inoperable fire detection or suppression system returned to service before beam restoration.

The small fire loading and the fact that the heat source for the fire is removed when emergency actions are taken to de-energize the equipment, support this change. Operating procedures will be revised and approved that specify the alternative indications that can be used to indicate the possibility of equipment overheating or fire, and the actions to be taken if abnormal indications show potential problems. Safety reviews of these procedures will include BNL subject matter experts in the area of fire protection and accelerator equipment. The BNL Fire/Rescue Group, which is manned at all times, regardless of the machine status, will be aware of these impairments when they occur. Action to repair the failed systems will always be completed as soon as reasonably achievable.

It is noted that the AGS, Booster and Linac authorization documents are written in the format of nuclear facility authorization documents because the Accelerator Safety Order did not exist at the time these authorization documents were approved by DOE. By agreement, the OSLs and SARs for these facilities will be updated to an ASE and SAD in 2005.

It is further noted that the 80-hour grace period is not intended to be used as the routine way of dealing with fire detection and suppression system failures. FY04 AIP funds have been requested to upgrade the aging fire detection and suppression systems in these facilities. We expect that installation of new systems will improve system reliability, reduce corrective maintenance and reduce machine downtime that we experience due to system failures.

\* \* \*

Copy w/o attachments to:

Karol, R.  
Lowenstein, D.  
Roser, T.



managed by Brookhaven Science Associates  
for the U.S. Department of Energy

# Memo

*Date:* January, 9, 2003

*To:* E. Lessard (Lab ESH Committee), J. W. Glenn (C-AD ASSRC)

*From:* R. Karol

*Subject:* Proposed Change to Operating Safety Limit for Fire Protection in C-AD OPM 2.5, Operational Safety Limits/Accelerator Safety Envelope for AGS, Booster and Linac, Section 5.4

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The attached proposed change is submitted for your review. The C-AD ASSRC should inform the BNL ESH Committee if they recommend approval. If acceptable to the ESH Committee, then it should be recommended for approval by the BNL Deputy Director for Operations and forwarded to DOE-BAO for approval.

The attached changes are shown, denoted in track changes, and the reason for the change is described after the proposed change. The proposal utilizes exceptions to the fire protection OSL for a limited time in order to allow continued beam operations or maintenance in areas where the fire detection or suppression systems are out of service as long as compensatory actions are taken to provide a level of equivalent safety.

Because of the need to get this change approved as soon as possible, it only addresses the fire protection issues. I expect to send you similar changes related to exceptions for the other C-AD approved ASEs and to reformat OPM 2.5 into the current SBMS ASE format in the near future.

Cc: J. Levesque  
P. Ingrassia  
A. Etkin

## Lessard, Edward T

---

**From:** Levesque, Joseph W  
**Sent:** Wednesday, January 15, 2003 3:42 PM  
**To:** Karol, Raymond C  
**Cc:** Lessard, Edward T; Glenn, Joseph W; Marotta, Frank J; Searing, John M  
**Subject:** FW: Draft Change to AGS OSL



Draft Change to  
AGS OSL.doc (3...

I have reviewed the changes to the OSL and approve.

Joe Levesque  
Brookhaven National Laboratory  
Building 599  
Upton, New York 11973  
Phone: (631) 344-4259  
Fax: (631) 344-5887

-----Original Message-----

From: Ray Karol [mailto:rck@bnl.gov]  
Sent: Wednesday, January 15, 2003 3:40 PM  
To: Levesque, Joseph W  
Cc: Lessard, Edward T; Glenn, Joseph W  
Subject: Re: Draft Change to AGS OSL

Hi Joe:

Here is the version that incorporates your comments. I agree that it is a little wordy but it conforms to the current AGS OSL. When we convert the OSLs to an ASE (soon to come out for review) it will be "leaner".

Please send email to Ed and Woody to show your concurrence, if OK. That way ASSRC can tell the BNL ESH Committee that they recommend approval of the change and the process can begin.

Thanks:

Ray

----- Original Message -----

From: "Levesque, Joseph W" <levesque@bnl.gov>  
To: "Karol, Raymond C" <karol@bnl.gov>  
Sent: Wednesday, January 15, 2003 12:04 PM  
Subject: Draft Change to AGS OSL (OPM 2

> My comments are in green.

>

> There is a lot of info in this. In reading it I had the feeling that  
> it could be simplified. But I can't exactly say how.

>

> It will work.

>

> <<Draft Change to AGS OSL.doc>>

>

## Lessard, Edward T

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**From:** Glenn, Joseph W  
**Sent:** Tuesday, January 28, 2003 12:19 PM  
**To:** Lessard, Edward T; Karol, Raymond C  
**Subject:** Re: ASE Change Proposed

Ray - Sorry for the delay. The changes to the ASE as we modified them are, I feel as Chair of the ASSRC, a good balance between safety and our scientific goals and thus should be approved by the Lab Management and DOE.  
- Woody

At 11:05 AM 1/28/03 -0500, you wrote:

>Hi Woody:

>  
>  
>

>I am preparing a mailing to the Lab ESH Committee on the proposed ASE  
>change for fire protection. I will need an email from the ASSRC Chair  
>indicating the ASSRC is OK with it. Ray indicated you had some issues  
>but that he thinks you are on board with it now that you have talked to  
>Pete Ingrassia.

>  
>  
>

>If OK, please send me an email.

>  
>  
>

>Thanks.

>  
>  
>

>Ed

>  
>

## CURRENT APPROVED ASE FIRE PROTECTION OSL

### 5.4 Fire Protection Operational Safety Limits in the C-A Accelerators and Experimental Areas (**OSL-C-A 4.0**)

- I. Persons Responsible: The on-duty Operations Coordinator, or a [C-A ES&H Coordinator](#), shall take appropriate action should he/she be notified by the BNL Fire Rescue Group that both the fire protection and fire detection systems are impaired for a specific area in the AGS, Booster, Linac or associated experimental areas. These actions may either be prohibiting personnel from working in the specific area and/or de-energizing equipment.
- II. Systems requiring limit: The sprinkler/standpipe systems in the AGS, Booster and Linac, smoke detectors in the AGS HVAC system, the manual fire alarm stations in the AGS, Booster and Linac.
- III. Purpose of the limit: to minimize fire hazard to personnel, equipment and the program.
- IV. Parameter Limited: Functional capacity of the required systems.
- V. Requirements:
  1. Design Features:

The incidence of fire is minimal due to the low flammability of the magnets and cables, and the stringent controls on flammable gases and liquids, including liquid hydrogen. Beam enclosures are concrete for shielding requirements, and are nonflammable.
  2. Safety Limits:
    - a. During periods of beam operation, either the sprinkler/standpipe system or the smoke detectors in the AGS, Booster or Linac HVAC systems, shall be in service.
    - b. During periods of shutdown, and if the facility is to be occupied, either the sprinkler/standpipe system or the smoke detectors in the AGS, Booster or Linac HVAC systems, or the manual fire alarm stations, shall be in service.
  3. Administrative Controls: Maintenance and testing of fire protection and detection systems is described in [Facility Use Agreements](#).

## **Draft Change to AGS OSL (OPM 2.5), Section 5.4**

### 5.4 Fire Protection Operational Safety Limits in the C-A Accelerators and Experimental Areas (**OSL-C-A 4.0**)

- I. Persons Responsible: The on-duty Operations Coordinator, or the C-A ESH Coordinator, shall take appropriate action should either or both the installed fire detection and fire suppression systems are impaired for a specific area in the AGS, Booster, Linac or associated experimental areas and accelerator support buildings. The required actions are described in the operating procedures (OPM 3.24).
- II. Systems requiring limit: (1) The installed fire detection and suppression systems in the AGS ring, Booster ring and Linac transport line, including smoke detectors in the AGS HVAC system, and the manual fire alarm stations in the AGS, Booster and Linac. (2) The installed fire detection and suppression systems and the manual fire alarm stations in buildings that provide electrical power supplies and instrumentation for ring and transport line operations.
- III. Purpose of the limit: To minimize fire hazard to personnel, equipment and the program.
- IV. Parameter Limited: Functional capacity of the required systems.
- V. Requirements:

1. Design Features:

The incidence of fire is minimal due to the low flammability of the magnets and cables, the stringent controls on flammable gases and liquids, including liquid hydrogen used in beam line experiments, control of ignition sources and interlocking/over-current protection of equipment that pose ignition potentials. Beam enclosures for extraction into experiments and experiment transport lines and target caves are made of concrete in order to meet shielding requirements, and are nonflammable. Fire spread rating on cables decreases their fuel contributions. Minimization of transient combustibles further reduces the potential size of a fire.

The inaccessible portions of the accelerators during beam operations have fire detection and suppression. The

detection includes smoke detectors and heat detectors, with smoke detection the most sensitive for early warning of a fire. Fire suppression is provided automatically by sprinkler system or manually by the BNL Fire Rescue Group that is manned at all times, regardless of the machine status.

During periods of authorized inoperability of all or portions of the fire detection and suppression systems, compensatory actions, including administrative and operating procedure guidance or a fire watch, are used to continue to ensure adequate detection of a fire so the BNL Fire/Rescue Group may be summoned by manual fire alarm, radio or phone.

2. Safety Limits:

- a. During periods of beam operation, when access to the primary beam areas at Linac, Booster or AGS is prohibited the installed fire detection and suppression systems shall be operable.

Exception: Within 2 hours of discovery, the Department Chair or designee may allow partial or full inoperability of any fire detection and/or suppression system for up to 80 hours with beam operations if the benefit of continuing accelerator operations is judged to outweigh the potential risk of fire damage. Operating procedures (OPM 3.24) shall specify the compensatory actions to be taken during inoperability.

- b. During periods of shutdown, if the facility is to be occupied, the installed fire detection and suppression systems or the manual fire alarm stations, in the occupied areas shall be operable.

Exception: The Operations Coordinator, ESH Coordinator or designee may allow partial or full inoperability of any fire detection system, occupied areas as long as a Fire Watch is posted who can verbally communicate with the BNL Fire/Rescue Group by radio or phone.

## Draft Change to AGS OSL (OPM 2.5), Section 5.4

### 5.4 Fire Protection Operational Safety Limits in the C-A Accelerators and Experimental Areas (OSL-C-A 4.0)

- I. ~~I. —~~Persons Responsible: The on-duty Operations Coordinator, or ~~a C-A ES&H Coordinator~~ the C-A ESH Coordinator, shall take appropriate action should ~~he/she be notified by the BNL Fire Rescue Group that~~ either or both the ~~fire protection and~~ installed fire detection and fire suppression systems are impaired for a specific area in the AGS, Booster, Linac or associated experimental areas. ~~These actions may either be prohibiting personnel from working in the specific area and/or de-energizing equipment.~~ and accelerator support buildings. The required actions are described in the operating procedures (OPM 3.24).
- II. Systems requiring limit: (1) The ~~sprinkler/standpipe~~ installed fire detection and suppression systems in the AGS ring, Booster ring and Linac; transport line, including smoke detectors in the AGS HVAC system, and the manual fire alarm stations in the AGS, Booster and Linac. (2) The installed fire detection and suppression systems and the manual fire alarm stations in buildings that provide electrical power supplies and instrumentation for ring and transport line operations.
- III. Purpose of the limit: ~~to~~ To minimize fire hazard to personnel, equipment and the program.
- IV. Parameter Limited: Functional capacity of the required systems.
- V. Requirements:
  1. Design Features:

The incidence of fire is minimal due to the low flammability of the magnets and cables, ~~and~~ the stringent controls on flammable gases and liquids, including liquid hydrogen- used in beam line experiments, control of ignition sources and interlocking/over-current protection of equipment that pose ignition potentials. Beam enclosures ~~are concrete~~ for extraction into experiments and experiment transport lines and target caves are made of concrete in order to meet shielding requirements, and are nonflammable. Fire spread rating on cables decreases their fuel contributions. Minimization of transient combustibles further reduces the potential size of a fire.

The inaccessible portions of the accelerators during beam operations have fire detection and suppression. The detection includes smoke detectors and heat detectors, with smoke detection the most sensitive for early warning of a fire. Fire suppression is provided automatically by sprinkler system or manually by the BNL Fire Rescue Group that is manned at all times, regardless of the machine status.

During periods of authorized inoperability of all or portions of the fire detection and suppression systems, compensatory actions, including administrative and operating procedure guidance or a fire watch, are used to continue to ensure adequate detection of a fire so the BNL Fire/Rescue Group may be summoned by manual fire alarm, radio or phone.

2. Safety Limits:

~~a. During periods of beam operation, either the sprinkler/standpipe system or the smoke detectors in the AGS, Booster or Linac HVAC systems, shall be in service.~~

~~b. During periods of shutdown, and if the facility is to be occupied, either the sprinkler/standpipe system or the smoke detectors in the AGS, Booster or Linac HVAC systems, or the manual fire alarm stations, shall be in service.~~

a. ~~3. Administrative Controls: Maintenance and testing of fire protection and detection systems is described in Facility Use Agreements.~~ During periods of beam operation, when access to the primary beam areas at Linac, Booster or AGS is prohibited the installed fire detection and suppression systems shall be operable.

Exception: Within 2 hours of discovery, the Department Chair or designee may allow partial or full inoperability of any fire detection and/or suppression system for up to 80 hours with beam operations if the benefit of continuing accelerator operations is judged to outweigh the potential risk of fire damage. Operating procedures (OPM 3.24)

shall specify the compensatory actions to be taken during inoperability.

- b. During periods of shutdown, if the facility is to be occupied, the installed fire detection and suppression systems or the manual fire alarm stations, in the occupied areas shall be operable.

Exception: The Operations Coordinator, ESH Coordinator or designee may allow partial or full inoperability of any fire detection system, occupied areas as long as a Fire Watch is posted who can verbally communicate with the BNL Fire/Rescue Group by radio or phone.

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Phone 631 344-4250  
Fax 631 344-5954  
lessard@bnl.gov

Managed by Brookhaven Science Associates  
for the U.S. Department of Energy

**Date:** February 28, 2003

**To:** T. Sheridan, Deputy Director for Operations

**From:** E. Lessard, Chair, BNL Environment, Safety and Health Committee *ELR*

**Subject:** LESHC 03-01, Recommendation for Approval of Proposed C-A Department's Operational Safety Limit Change

The BNL ES&H Committee and the BNL Fire Protection Engineer have reviewed the proposed change to the Collider-Accelerator Department's operational safety limit (OSL) for fire protection at AGS, Booster and Linac. This OSL is part of the authorization-basis-documents for these facilities, documents that predate the Accelerator Safety Order. The current documents will be converted from SAR / OPM format to SAD / ASE format in 2005, as part of the Labwide Accelerator Authorization Basis Upgrade.

In 1995, the Accelerator Safety Envelope was approved by DOE in the form of an OPM procedure. Specifically, C-AD proposes to modify the limitation contained in OSL 4.0 in OPM 2.5, "Operational Safety Limits/Accelerator Safety Envelope for AGS, Booster and Linac." This change will allow the C-AD Department Chair (or designee) to approve continued AGS, Booster and/or Linac operation for up to 80 hours with an inoperable fire detection or suppression system. No other OSL in OPM 2.5 would be changed.

The interim compensatory actions to be invoked during the 80-hour window are described in OPM 3.24, "Procedures to be Implemented for Facility Fire Alarm System Problems."

The review was coordinated electronically, commencing in late January. The Committee raised several questions during the course of our review. All questions were addressed satisfactorily by the C-AD staff. By unanimous vote, the Committee recommends your approval of this OSL revision.

CC (via Email):

Committee Members

R. Karol  
P. Kelley (BAO)  
J. Levesque  
D. Lowenstein  
T. Roser

CONCURRENCE
OSMD PTC
CAROLAN/kg
08/07/95
OSMD PWD
DESMARAIS
08/7/95
DAM
CRESCENZO
08/7/95
AM
CRESCENZO
08/7/95

AUG - 7 1995

Dr. M. S. Davis  
 Associated Universities, Inc.  
 Brookhaven National Laboratory  
 Upton, New York 11973

Dear Dr. Davis :

**SUBJECT: ACCELERATOR SAFETY ENVELOPES FOR ALTERNATING GRADIENT SYNCHROTRON (AGS) AND AGS TO RELATIVISTIC HEAVY ION COLLIDER (RHIC) TRANSFER LINE**

Reference: Letter, M. Brooks to C. Nealy, Subject: Same as Above, Dated August 2, 1995

The Brookhaven Area Office (BHO) has reviewed the subject documentation submitted as attachments to the referenced letter, against the requirements of DOE Order 5480.25.

Accordingly, I approve the Accelerator Safety Envelope for the AGS, as applicable to AGS operation, and the Accelerator Safety Envelope for the AGS to RHIC (AtR) line, as applicable to AtR line commissioning. As required by DOE Order 5480.25, AGS and RHIC facilities shall confine activities within the limits prescribed by these Accelerator Safety Envelopes or otherwise stop any activity violating the Accelerator Safety Envelope and inform DOE.

If there are any questions concerning this matter, please contact Pepin Carolan of my staff, at ext. 5966.

Sincerely,

**ORIGINAL SIGNED BY  
 FRANK CRESCENZO FOR**

Carson L. Nealy  
 Area Manager

- cc: J. Dooling, ESHD, CH
- D. Lowenstein, BNL
- S. Ozaki, BNL
- E. Lessard, BNL
- S. Musolino, BNL
- W. R. Casey, BNL
- H. Kahnhauser, BNL

FILE CODE
5480.25



BROOKHAVEN NATIONAL LABORATORY  
ASSOCIATED UNIVERSITIES, INC.

Upton, Long Island, New York 11973-5000

(516) 282-  
FTS 666-

August 2, 1995

Dr. Carson Nealy  
DOE Area Office  
Brookhaven National Laboratory  
Upton, New York 11973-5000

**SUBJECT:** Accelerator Safety Envelopes for AGS and AGS to RHIC Transfer Line

**REFERENCE:** Letter, Nealy to Davis, Subject: Commissioning Plan for Fast Extracted Beam, V Line and AGS to RHIC, dated June 28, 1995

Dear Dr. Nealy,

The approval for the Commissioning Plan in the above reference did not include approval for Accelerator Safety Envelopes (ASEs) for the AGS and RHIC, which were included as attachments in the plan. The ASEs in the plan are superseded by the attached versions. I am submitting these ASEs to the BHO for separate review and approval in accordance with DOE Order 5480.25.

Yours truly,

Michael Brooks  
Directors Office

MB/EL:dc

Copy to:

H. Kahnhauser  
E. Lessard  
D. Lowenstein  
S. Musolino  
S. Ozaki

**Attachments:**

AGS-OPM 2.5, "Operational Safety Limits/Accelerator Safety Envelope", July 21, 1995.  
AGS-TPL 95.08, "Operational Safety Limits for Initial Commissioning of the AtR", July 17, 1995.



RECEIVED

**Department of Energy**

Brookhaven Area Office  
P. O. Box 5000  
Upton, New York 11973

CC Number: CC2003-2387  
Director: Sheridan, T  
Due: Rec'd: 5/21/2003  
PDF File Name: CC2003-2387-ID.pdf  
Concurrence: Not Required  
Actionee  
Actionee Due Date:

MAY 21 2003

MAY 20 2003

Deputy Director,  
Operations

Mr. Thomas R. Sheridan  
Brookhaven Science Associates, LLC  
Brookhaven National Laboratory  
Upton, N.Y. 11973

Dear Mr. Sheridan:

**SUBJECT: MODIFICATION TO THE ALTERNATING GRADIENT SYNCHROTRON (AGS) ACCELERATOR SAFETY ENVELOPE (ASE) OPERATING SAFETY LIMIT (OSL) 4.0, FIRE PROTECTION**

**Reference:** Letter from T. Sheridan, BNL, to M. Holland, BAO, Subject: "Modification to the Operating Safety Limit 4.0 of the AGS ASE", dated March 3, 2003.

The current DOE approved AGS ASE OSL 4.0 on fire protection (applicable to AGS, Booster and LINAC) could require the de-energizing of facility equipment should the installed fire detection and/or fire suppression system become partially or fully inoperable. Depending on the extent of inoperability, de-energizing certain facility equipment could lead to a facility shutdown. While the de-energizing of equipment reduces the risk of fire, other actions can be taken to reduce the fire risk without de-energizing equipment, thereby possibly preventing an unnecessary facility shutdown.

As requested, a review was performed on the proposed modification to the AGS ASE OSL 4.0. The proposed modification would authorize the Collider-Accelerator Department (C-AD) Chair or designee to allow continued operation of the AGS, Booster, and/or LINAC facilities for up to 80 consecutive hours with any partially or fully inoperable fire detection and/or fire suppression systems. When the fire detection and/or fire suppression systems are inoperable, suitable compensatory or interim actions would be taken to minimize the fire risk. These actions may include firewatches and other controls as described in your proposed OSL modification.

Based on our review, the proposed AGS ASE OSL 4.0 is approved contingent on the following:

- 1) Expedient corrective actions will be taken to return the inoperable fire detection and/or fire suppression system to an operable status to minimize the time of inoperability.
- 2) When fire detection and/or fire suppression systems are inoperable, the appropriate actions are taken as described in the BNL Environment, Safety and Health (ESH) Standard 4.0, Fire Protection.

MAY 20 2003

- 3) As soon as practicable, the BAO Facility Representative shall be informed following a C-AD decision allowing continued facility operation with an inoperable fire detection and/or fire suppression system (i.e., entering the AGS ASE OSL 4.0, Section V, Item 2a, Exception statement).

If you have any questions, please contact Peter Kelley of my staff at extension 5784.

Sincerely,

A handwritten signature in black ink, appearing to be 'Michael D. Holland', written in a cursive style.

 Michael D. Holland  
Area Manager

cc: S. Mallette, BAO  
D. Lowenstein, BNL  
E. Lessard, BNL  
R. Karol, BNL  
J. Levesque, BNL