

(Partial) Operational Readiness Clearance (Non-beam operation)

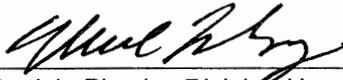
DECAM

29 August 2010

AUTHORIZATION TO PROCEED WITH THE UNATTENDED OPERATION OF CTIO LN2
CRYOCHILLER SYSTEM OF DECAM IN SIDET

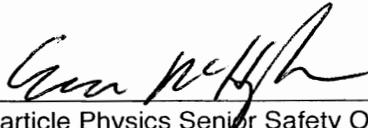
REVIEWED AND APPROVED BY:

DATE



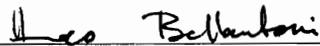
9/1/2010

Particle Physics Division Head
Comments/Exceptions:

 13747N

1 Sept 2010

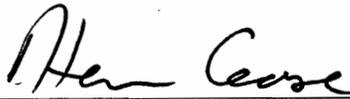
Particle Physics Senior Safety Officer
Comments/Exceptions:



29 August 2010

Committee Chair
Comments/Exceptions:

Submitted By:



8-30-10

Requester Herman Cease

Electronic approvals for this form are acceptable. Please forward your responses to all recipients. A signed paper form (copy) of this document will exist in the Particle Physics Division Office. The original signed document will stay with the experiment requesting clearance.

From: Keith Schuh <schuh@fnal.gov>
Subject: Re: ORC for the DECam LN2 system
Date: August 30, 2010 9:53:00 AM CDT
To: Leo Bellantoni <bellanto@fnal.gov>
Cc: Herman Cease <cease@fnal.gov>, juan cruz estrada vigil <estrada@fnal.gov>, Steve Chappa <chappa@fnal.gov>, "K. Wyatt Merritt" <wyatt@fnal.gov>

Leo,

I stopped out and looked at the enclosure. It looks OK.

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

From: bellanto <bellanto@fnal.gov>
Date: Thursday, August 26, 2010 12:22 pm
Subject: Re: ORC for the DECam LN2 system
To: Herman Cease <cease@fnal.gov>
Cc: juan cruz estrada vigil <estrada@fnal.gov>, Keith Schuh <schuh@fnal.gov>, Steve Chappa <chappa@fnal.gov>, "K. Wyatt Merritt" <wyatt@fnal.gov>

Hi Herman,

I believe Keith is back on Monday - he should give this a quick look

1st.

Leo

Dr. Leo Bellantoni (630)730-2155
MS 357, Fermilab Batavia, IL 60510

On Aug 26, 2010, at 10:48 AM, Herman Cease wrote:

Hi Keith, Leo,

All of the below items were previously addressed except #3, replacing the electronic enclosure with a water tight enclosure.

We have now addressed that item as well, and are asking for the complete ORC approval for the DECam LN2 cooling system.

From: Herman Cease <cease@fnal.gov>
Subject: ORC for the DECam LN2 system
Date: August 26, 2010 10:48:19 AM CDT
To: Leo Bellantoni <bellanto@fnal.gov>, Juan Cruz Estrada Vigil <estrada@fnal.gov>
Cc: Keith Schuh <schuh@fnal.gov>, Steve Chappa <chappa@fnal.gov>, "K. Wyatt Merritt" <wyatt@fnal.gov>
▶ 1 Attachment, 291 KB

Hi Keith, Leo,

All of the below items were previously addressed except #3, replacing the electronic enclosure with a water tight enclosure.

We have now addressed that item as well, and are asking for the complete ORC approval for the DECam LN2 cooling system.

See attached document for additional information and photos of the new enclosure.

Thank you
Herman Cease
x6453

On Jul 9, 2010, at 8:22 AM, Keith Schuh wrote:

Three issues were identified during the electrical review of the DeCam LN2 Controls.

1. The DeCam Control Wiring Enclosure located outdoors contains both Class 1 control wiring and Class 2 power distribution wiring (220 VAC motor power). This is prohibited by the 2008 NEC Code Article 725.48(B) (1). The article states:

(B) Class 1 Circuits with Power-Supply Circuits. Class 1 circuits shall be permitted to be installed with power-supply conductors as specified in 725.48(B)(1) through (B)(4).

(1) In a Cable, Enclosure, or Raceway. Class 1 circuits and power-supply circuits shall be permitted to occupy the same cable, enclosure, or raceway only where the equipment powered is functionally associated.

After discussion with the electrical design engineer it was agreed that the control circuitry and power circuitry located inside the enclosure were not functionally associated. The 220VAC power should be removed from the DeCam Control Wiring Enclosure and relocated to separate junction box or enclosure that is approved for outdoor use.

2. I could not identify if the 90 degree liquidtight fitting located on the west side of the DeCam Control Wiring Enclosure was of the type approved for use in damp and wet locations. This needs to be investigated and the fitting replaced if it is not approved for that intended use.

3. The Solenoid Valve Box Wiring Enclosure needs to be repaired or replaced. The enclosure is rated for use in damp or wet locations but, investigation showed the enclosure was allowing water to enter. The cause might be associated with the use of the wrong type of fitting, to large of a knockout used or hole cut when installing the fitting, or a poor seal on the cover door.

Aug 26, 2010

Steve,

The ORC review of the DECam LN2 system brought up several issues that needed to be addressed prior to the ORC approval. The remaining item about replacing the electronic enclosure with a water tight enclosure has now been addressed.

- 1) AC solenoid small outdoors enclosure not water tight.

The enclosure has been replaced. The enclosure is larger and is now watertight. All penetrations are in the bottom of the enclosure. All solenoids were moved from the external valves to inside the water tight enclosure. All wire sizes, fuses, and the wiring diagram remains the same. See Figures 1 and 2 below.

We are now asking the ORC panel to grant us complete unattended operations for the LN2 system that provides cooling to the DECam imager vessel at Lab A.

Thank You
Herman Cease
X6453

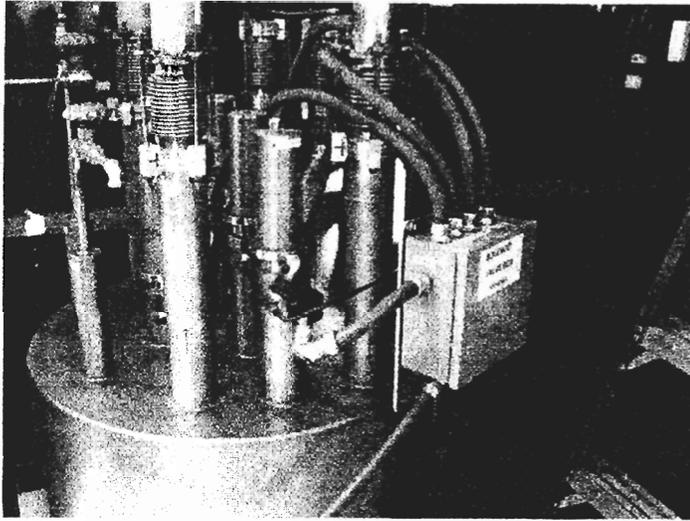


Figure 1. Original setup: Small outdoors enclosure, Powered only during attended hours.

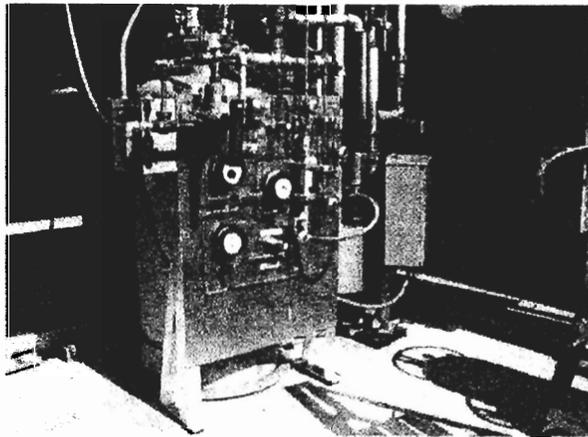


Figure 2. New replacement water tight enclosure. All penetrations are in the bottom of the enclosure.

From: Keith Schuh <schuh@fnal.gov>
Subject: **Re: LN2 controls ORC response**
Date: July 23, 2010 9:48:40 AM CDT
To: Steve Chappa <chappa@fnal.gov>
Cc: Leo Bellantoni <bellanto@fnal.gov>, 'Herman Cease' <cease@fnal.gov>, 'Wyatt Merritt' <wyatt@fnal.gov>

Leo,

I looked at the setup today and I am OK with operating the motor, large outdoor enclosure and indoor controls rack in unattended mode. The outdoor enclosure should only be operated in attended mode until it is repaired or made weather proof.

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

From: Steve Chappa <chappa@fnal.gov>
Date: Thursday, July 22, 2010 11:27 am
Subject: LN2 controls ORC response
To: 'bellanto' <bellanto@fnal.gov>, 'Keith Schuh' <schuh@fnal.gov>
Cc: 'Herman Cease' <cease@fnal.gov>, 'Wyatt Merritt' <wyatt@fnal.gov>

Hi Dr. Leo, Keith,

Herman has made modifications the outside enclosure that had the 208VAC motor circuit in it. He also proposed the use of the smaller enclosure only in attended situations until he get the scheduled work done on the small enclosure's seals and repair. So the ORC would apply to the controls rack and the large enclosure's circuits only. This sounds reasonable to me. See what you think. Attached is the document with the pictures showing these changes. If you need anything else, please let us know.

Later,

Steve

July 21, 2010

Steve,

The ORC review of the DECam LN2 system brought up several issues that needed to be addressed prior to the ORC approval. Here is the DECam response to those issues.

1) Mixed power in the outdoors large electrical enclosure.

The 3 phase 208 VAC is separated out of the enclosure. The separation occurs in a different enclosure located above the LN2 dewar. See photos below.

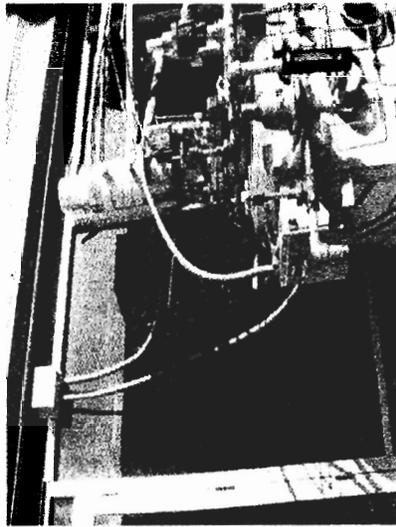
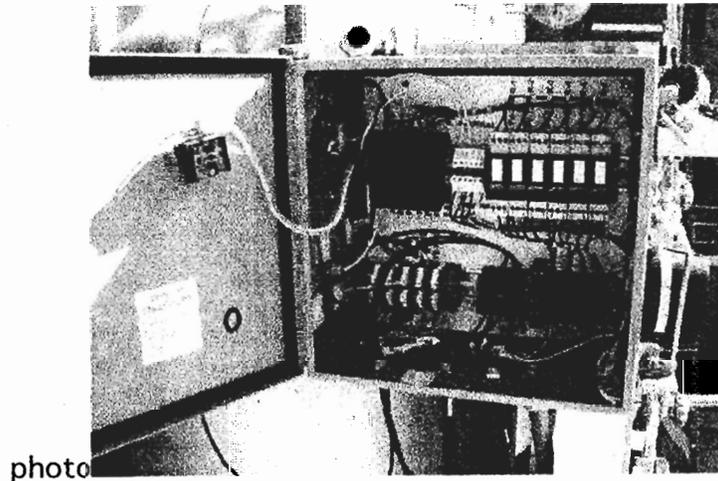


Figure 1. Separate enclosure for 208 – 3 phase power shown in upper left corner of



photo

Figure 2: Shows all 3 phase power removed from the lower enclosure.

Seal tight fittings are water tight, and contain seals.

2) AC solenoid small outdoors enclosure not water tight.

The enclosure needs to be replaced. In the short term we will not power this enclosure in an unattended mode. Administrative control of the power to the enclosure is controlled with a switch indoors near the process PC. Herman Cease will take administrative control over the switch to ensure that the enclosure is not powered in off hours. Once the enclosure is replaced, we will ask for a new review of the system.

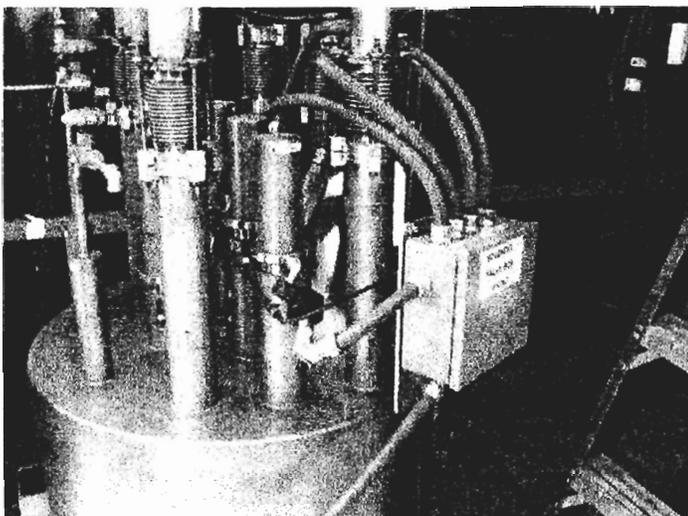


Figure 3. Small outdoors enclosure, Powered only during attended hours.

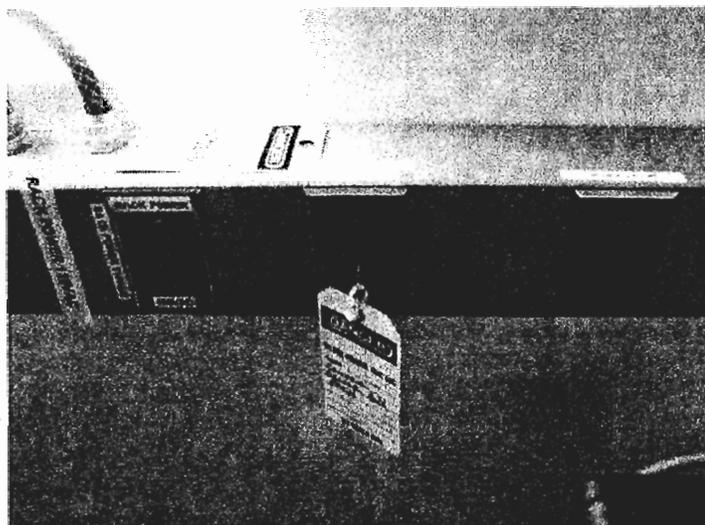


Figure 4. Key switch for AC power to the small outdoors enclosure.

Key is under administrative control by Herman Cease.

From: Michael Lindgren <mlindgre@fnal.gov>
Subject: Re: Lab A DECam CTIO Phase I Cryo Review
Date: May 28, 2010 9:53:13 AM CDT
To: Phil Pfund <pfund@fnal.gov>
Cc: Leo Bellantoni <bellanto@fnal.gov>, Herman Cease <cease@fnal.gov>, Brian Degraff <degraff@fnal.gov>, Dave Pushka <pushka@fnal.gov>, Tom Page <tpage@fnal.gov>, Arkadiy Klebaner <klebaner@fnal.gov>, Luz Jaquez <ljaquez@fnal.gov>

Thanks Phil, I accept your panels recommendations.

Best, Mike

On 5/28/10 9:39 AM, Phil Pfund wrote:

Mike,

I have attached our cryo panel's review positive recommendation for the Phase I DECam CTIO test in Lab A.

Our recommendation is addressing two requests:

1. Immediate attended Phase I operation of the cryo system.
2. Input to the ORC review for unattended Phase I operation chaired by Leo Bellatoni.

Phil

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Philip A. Pfund
Fermi National Accelerator Laboratory
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FAX 630-840-8011

-
Machine Shop, MS-332
40 Shabbona

-
Engineering, MS-316
Trailer - 183

To: Mike Lindgren
Particle Physics Division

From: Phil Pfund
Chair, Village Cryogenic Safety Review Panel

Subject: DECam Lab A CTIO System – Phase I

Dear Mike,

The Village Cryogenic Safety Review Panel has completed its review of Phase I of the DECam CTIO cryogenic system in Lab A. This review is in support of the Operational Readiness Clearance review chaired by Leo Bellatoni.

Phase I of the DECam CTIO cryogenic system is the initial testing of the Imager Cooling system in Lab A. The system will be operated on the floor at Lab A. Hoses and transfer lines will be in static orientation.

Phase II, which is not included in this review but will be reviewed later, is to install piping on the Telescope Simulator at Lab A. The Imager Vessel will be cooled on the Telescope Simulator. Hoses and transfer lines will move with the Telescope Simulator.

Our review consisted of:

- Review of safety related documentation for the modification. All of the DECam CTIO system documentation and updates are maintained by Herman Cease at: <http://des-docdb.fnal.gov:8080/cgi-bin/ShowDocument?docid=2596>
login: desreviews, password: DESrev The documentation related to the modification is collected by subject area and consists of:
 - LN2 Vessel Engineering Note
 - LN2 Vessel Val-Fab Code Stamp Analysis Report.
 - LN2 Vessel Flange Engineering Note.
 - LN2 Vessel Flange Calculation Spreadsheet.
 - LN2 Vessel Flange Specification and Vendor Drawings.
 - LN2 Vessel Flange Insert Drawing, 436893.
 - LN2 Vessel Pressure Test Procedure, JHA, and Test Permit.
 - Process and Instrumentation Diagram, 480313-B1, 3/19/10.
 - Instrumentation and valve list, 4/15/10.
 - Failure Mode and Effect analysis, 4/15/10.
 - What-if Analysis, 4/15/10.
 - Operating Procedures, 4/14/10.
 - Controls and Interlock Description, 4/2/10.

- SiDet ODH Analysis, Calculation Spreadsheet, and General Layout Drawing 466869, 3/15/10.
- Piping Engineering Note.
- In-process Weld Inspection Records.
- Piping Pressure Test Procedure, JHA, and Test Permit.
- Wiring Diagram for LN2 and Process Operations, 436698, 7/13/09.
- Wiring Diagram for Imager Vessel, 436699, 2/16/10.
- 5/20/10 visit to Lab A by panel members to view installation and discuss the progress with Herman Cease.
- 5/27/10 visit to Lab A by panel chair to view the state of the installation and to discuss the documentation with Herman Cease. The Imager Vessel is presently in the clean room. During Phase I operation it will be moved several times between the test area and the clean room. The cryogenic connections are designed for easy, reliable connect/disconnect. All of the safety related devices on the vessel are in place. Some electrical work is still being reviewed by the ORC panel.

Based on the above listed review activities, we are satisfied that the DECam CTIO cryogenic system in Lab A can be operated safely in the Phase I mode. Therefore we recommend that you authorize **attended** operation until such time as the final ORC review and recommendation for unattended Phase I operation is provided by Leo Bellatoni.

Regards,

Phil Pfund
On behalf of the Village Cryogenic Safety Review Panel

Copy: Herman Cease
Leo Bellatoni, ORC Chair
Panel Members (Brian DeGraff, Tom Page, Dave Pushka)
Arkadiy Klebaner, CSS Chair