Los Alamos NATIONAL LABORATORY

USQ PROCESS
APPLICABILITY ASSESSMENT

Change Number: Memo LANSCE-6-05-023 Date: 4/21/05

Facility-Specific USQ AA Number: 53-USQ-ER-05-019

Facility Identification: Actinide Experiments

Change Title: FP-12 hydrogen target vent installation and operation

Results Summary

☒ The USQ process IS APPLICABLE, and USQ Screening will be performed
- ☒ based on completing the worksheet, or
- ☐ because the need for USQ processing is obvious without completing the worksheet. (Note: A hazard/safety analysis must be provided as appropriate.)

☐ The USQ process is NOT APPLICABLE to this situation, and
- ☐ NNSA review and approval is NOT REQUIRED, or
- ☐ NNSA review and approval is REQUIRED before implementation, and a Request for Amendment to the Facility Safety Basis should be prepared.

CLASSIFICATION

This document was reviewed to ensure proper classification and is classified as:

☒ Unclassified ☐ Unclassified Controlled Nuclear Information (UCNI)
☐ Official Use Only (OUO) ☐ Classified

NOTE: If this document is OUO, UCNI, and/or classified, add the appropriate markings, distribution limitation statement, and guidance data block(s).

Authorized Derivative Classifier (ADC)

Howard Nekimken | Howard Nekimken | 8/1/05
Name (printed or typed) | Signature | Date

UCNI Reviewing Official

Howard Nekimken | Howard Nekimken | 8/1/05
Name (printed or typed) | Signature | Date

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Retain original copy per facility records management procedures.

Los Alamos NATIONAL LABORATORY	USQ PROCESS APPLICABILITY ASSESSMENT
AA Number: 53-USQ-1L-05-019	Date: 4/21/05

SIGNATURES

Trainee (if applicable)

Name (printed or typed)	Signature	Date

Applicability Assessment Preparer (QEV)

Name (printed or typed)	Signature	Date
James Knudson	James Knudson	4/21/05

Applicability Assessment Reviewer (QEV)

Name (printed or typed)	Signature	Date
Ronald Selvage	Ronald Selvage	6/28/05

Approval Authority

Name (printed or typed)	Signature	Date
M. J. BAUMGARTNER	M. J. Baumgartner	6/24/05

USQ SCREENING & DETERMINATION APPLICABILITY ASSESSMENT

In assessing the applicability of USQ screenings and determinations to various situations, it is realized that: (1) some changes "DO NOT" require a USQ screening (and determination) and "DO NOT" require NNSA approval, (2) some changes "DO NOT" require a USQ screening (and adetermination) but "DO" require NNSA approval, and (3) if not covered by the first two cases, the change requires a USQ screening. Do not use USQ Process Applicability Assessments in situations involving PISAs.

NOTE: The number in brackets following the questions below is a reference to the corresponding section of the Procedure.

SECTION 1

a. Is this a replacement of equipment with an exact replacement? [8.2.1.a] ☐ YES ☒ NO

b. Is this a replacement of equipment with an approved equivalent part? [8.2.1.b] ☐ YES ☒ NO

If yes, identify the supporting engineering analysis which provides the equivalency determination.

Document No.: _____

Document Title: _____

c. Is this an SSC restoration to the existing approved design not in conflict with the existing approved DSA? [8.2.1.c] ☐ YES ☒ NO

d. Is this simply an editorial change to a procedure or document? [8.2.1.d] ☐ YES ☒ NO

If the answer to any of the questions in Section 1 is "Yes", the USQ screening and determination steps DOES NOT apply and NNSA review and approval is NOT REQUIRED; proceed to the applicability assessment summary. Otherwise, continue with Section 2.

Los Alamos NATIONAL LABORATORY	USQ PROCESS APPLICABILITY ASSESSMENT
AA Number: 53-USQ-1L-05-019	Date: 4/21/05

SECTION 2

a.	Is this a change that introduces a new technology to the facility? [8.2.2.a]	☐ YES	☒ NO
b.	Is this a change that is beyond those necessary to facilitate day-to-day operations? [8.2.2.b]	☐ YES	☒ NO
c.	Is this a change that is a major modification? [8.2.2c] Note: Preparation, submittal, and NNSA approval of a PDSA is also required for a major modification.	☐ YES	☒ NO
d.	Has management decided to submit the proposed change to NNSA for review and approval? [8.2.2.d]	☐ YES	☒ NO
e.	Is this a change to the TSRs, or the addition of a new TSR requirement? [8.2.2.e]	☐ YES	☒ NO

If the answer to any of the questions in Section 2 is "Yes", the USQ screening process DOES NOT apply, however, NNSA review and approval is REQUIRED before implementation. Therefore, if there is a "Yes" answer, a Request for Amendment of the Safety Basis should be prepared; see section 8.6 of the USQ Procedure. Otherwise, the USQ screening process DOES apply.

APPLICABILITY ASSESSMENT SUMMARY

Based on answers to the applicability assessment questions above:

☒ The USQ screening process APPLIES, and USQ Screening will be performed.
NOTE: A hazard, safety, and impact analysis must be provided as appropriate.

☐ The USQ screening process DOES NOT APPLY to this situation, and

- ☐ NNSA review and approval is NOT REQUIRED, or
- ☐ NNSA review and approval IS REQUIRED before implementation, and a Request for Amendment to the Facility Safety Basis should be prepared.

Complete the cover sheet summary.

Los Alamos NATIONAL LABORATORY

UNREVIEWED SAFETY QUESTION
SCREENING AND DETERMINATION WORKSHEET

Change Number: Memo LANSCE-6-05-023 Date: 4/21/05

Facility-Specific USQ Number: 53-USQ-ER-05-019

Facility Identification: Actinide Experiments

Change Title: FP-12 hydrogen target vent installation and operation

Based on the evaluation presented in this report, the:

- ☐ Need for routine USQ processing was obvious without performing an Applicability Assessment.
- ☐ Need for a routine USQD is obvious without performing a USQ Screen.
  Complete only General Information Section.
- ☐ Situation involves a PISA.
  Complete only General Information Section.
- ☐ Change has been screened out of the USQ process and does not constitute an Unreviewed Safety Question.
- ☒ Change does not constitute an Unreviewed Safety Question based on a full USQD.
- ☐ Change constitutes an Unreviewed Safety Question and NNSA approval is required prior to implementation.

CLASSIFICATION

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- ☐ Unclassified Controlled Nuclear Information (UCNI)
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- ☐ Classified

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List all UCNI guidance used:

Retain original copy per facility records management procedures.

Los Alamos NATIONAL LABORATORY

UNREVIEWED SAFETY QUESTION
SCREENING AND DETERMINATION WORKSHEET

USQ Number: 53-USQ-1L-05-019 Date: 4/21/05

SIGNATURES

Trainee (if applicable)

Name (printed or typed)	Signature	Date

USQ Screen Preparer (QEV)

Name (printed or typed)	Signature	Date
James Knudson	James Knudson	4/21/05

USQ Screen Reviewer (QEV)

Name (printed or typed)	Signature	Date
Ronald Selvage	Ronald Selvage	6/28/05

USQ Determination Preparer (QEV)

Name (printed or typed)	Signature	Date
James Knudson	James Knudson	4/21/05

USQ Determination Reviewer (QEV)

Name (printed or typed)	Signature	Date
Ronald Selvage	Ronald Selvage	6/28/05

Sponsoring Organization Reviewer (optional)

Name (printed or typed)	Signature	Date

Approval Authority

Name (printed or typed)	Signature	Date
M. J. BAUMGARTNER	M. J. Baumgartner	6/28/05

SECTION 1. INTRODUCTION

SECTION 1.1. DETAILED DESCRIPTION OF CHANGE

A liquid hydrogen target is to be installed at flight path #12 (FP-12), located in building MPF-30 of the Lujan Neutron Scattering Center, for a nuclear physics experiment. The apparatus will consist of a target vessel with a capacity of about 20 liquid liters of hydrogen plus ancillary equipment for gas handling, maintaining vacuum and providing the cooling necessary to maintain the hydrogen at cryogenic temperatures.

SECTION 1.2. REFERENCES

a) List all documents that describe the situation being considered and any technical evaluations thereof.

a.1) LANL memo LANSCE-6-05-023

a.2) NPDGamma Liquid Hydrogen Target Engineering Document, June 10, 2004

b) List documents in the current safety basis for the facility/process that were used in this USQ processing.

b.1) TA-53-BIO-005, Rev. 2, Basis for Interim Operation for Experiments on Neutron Scattering by Actinides at the Manuel J. Lujan Jr. Neutron Scattering Center (Lujan Center) Los Alamos National Laboratory, September 17, 2001.

b.2) Safety Evaluation Report (SER) for the LANSCE Actinide BIO, October 29, 2001.

c) List hazard, safety, or impact analyses related to the situation being considered that were used in this evaluation.

c.1) LANL memo LANSCE-6-05-023

d) List any other references used in this evaluation:

d.1) N/A

NOTE: If applicable and if a hazard (or safety) and impact analysis have not been provided, the change should be returned to change control to develop such an analysis.

SECTION 2. UNREVIEWED SAFETY QUESTION SCREENING

NOTE: The number in brackets following the questions below is a reference to the corresponding section of the Procedure.

SECTION 2.1. SCREENING – PART I [8.3.1]

This section (Screening – Part I) is:

☒ APPLICABLE (i.e., this USQ Screening is not in response to a PISA discovery).

☐ NOT APPLICABLE because this USQ Screening is in response to a PISA discovery. Complete only Part II of the Screening (Section 2.2) and continue to the USQD (Section 3). Note: Follow all additional steps outlined in the PISA worksheet.

a) Is this a purely editorial change to a document that does not affect the technical content? [8.3.1.a] ☐ YES ☒ NO

b) Is the change covered by a NNSA approved categorical exclusion? [8.3.1.b] ☐ YES ☒ NO

If "Yes", identify the Categorical Exclusion and the NNSA approval date.

Cat. Exclusion No.: _____ Approval Date _____

c) Is this change completely enveloped by a previous USQD? [8.3.1.c] ☐ YES ☒ NO

If "Yes", identify the USQD and the approval date.

USQD Number: _____ Approval Date _____

If "Yes", explain how the current issue is covered by the prior USQD.

If any answer to any question in Section 2.1 above is "Yes", the change does not require a USQ Determination; proceed to the USQ Screening Summary at the end of Section 2. Otherwise continue with Part II of the Screening (Section 2.2).

SECTION 2.2. SCREENING – PART II [8.3.2]

a) Is this a temporary or permanent change in the facility as described anywhere in the existing DSA? [8.3.2a]. ☒ YES ☐ NO
If NO, explain your answer below and list pertinent reference documents.

Note: Increases in facility chemical or radioactive inventories beyond those described in the DSA or EM&R screening values, whichever is lower, constitute a change to the facility as described in the DSA.

b) Is this a temporary or permanent change in the procedures as described anywhere in the existing DSA? [8.3.2.b] ☐ YES ☒ NO
If NO, explain your answer below and list pertinent reference documents.

No procedures are affected as a result of the proposed change.

c) Is this a test or experiment not described anywhere in the existing DSA? [8.3.2.c] ☒ YES ☐ NO
If NO, explain your answer below and list pertinent reference documents.

This is a new experiment not considered in the original Actinide BIO.

If the answer to any question in Section 2.2 above is "Yes", a USQ Determination must be performed. Continue to Section 3 after completing the Summary section below.

USQ SCREENING SUMMARY

Based on answers to the screening questions above:

☐ This change screens out and hence does not require a USQ Determination.
Complete the cover sheet summary.

☒ This change screens in and hence does require a USQ Determination.
Complete Section 3.

SECTION 3. UNREVIEWED SAFETY QUESTION DETERMINATION (USQD) [8.4]

NOTE: The number in brackets above is a reference to the corresponding section of the Procedure.

1. Could the proposed change increase the probability of occurrence of an accident previously evaluated in the DSA? ☐ YES ☒ NO
   Explain your answer below and list pertinent reference documents.

   The previously evaluated accident with the most relevance to the proposed change is a major building fire, since the design of the proposed change excludes the use of actinides on the flight path in question. The bounding probability of occurrence for the accidents previously analyzed is already at the highest binning level. The proposed change does not increase this.

   See LANL memo LANSCE-6-05-023.

2. Could the proposed change increase the consequences of an accident previously evaluated in the DSA? ☐ YES ☒ NO
   Explain your answer below and list pertinent reference documents.

   The accidents previously analyzed included the worst-case release of the building inventory limit of 450 Pu-equivalent-grams. The proposed change does not propose to increase this limit and therefore cannot increase the consequences of such an accident.

   See LANL memo LANSCE-6-05-023.

3. Could the proposed change increase the probability of occurrence of a malfunction of equipment important to safety previously evaluated in the DSA? ☐ YES ☒ NO
   Explain your answer below and list pertinent reference documents.

   The proposed liquid hydrogen target will not utilize or communicate with any equipment important to safety as defined in the actinide BIO. This change will therefore not be able to cause any of this equipment to malfunction.

   See LANL memo LANSCE-6-05-023.

4. Could the proposed change increase the consequence of a malfunction of equipment important to safety previously evaluated in the DSA? ☐ YES ☒ NO
   Explain your answer below and list pertinent reference documents.

   The proposed liquid hydrogen target will not utilize or communicate with any equipment important to safety as defined in the actinide BIO. This change will therefore not be able to affect the consequence of any malfunction of equipment important to safety.

   See LANL memo LANSCE-6-05-023.

5. Could the proposed change create the possibility of an accident of a different type than any previously evaluated in the DSA? ☐ YES ☒ NO
Explain your answer below and list pertinent reference documents.

The proposed change presents fire as its major accident scenario. This is the same as previously evaluated in the BIO.

See LANL memo LANSCE-6-05-023.

6. Could the proposed change create the possibility of a malfunction of equipment important to safety of a different type than any previously evaluated in the DSA? ☐ YES ☒ NO
Explain your answer below and list pertinent reference documents.

The proposed change does not interact with any of the equipment important to safety that is identified in the DSA.

See LANL memo LANSCE-6-05-023.

7. Does the proposed change reduce a margin of safety? ☐ YES ☒ NO
Explain your answer below and list pertinent reference documents.

There are no operating points, acceptance limits or failure points defined in the BIO. Therefore the proposed change does not reduce any margins of safety in the BIO.

See P-Division drawing package 29Y87754 (attached).

USQ DETERMINATION SUMMARY

If the answer to any question in Section 3 above is "Yes", the proposed change involves an Unreviewed Safety Question. Based on the evaluation above:

☒ This change does not constitute an Unreviewed Safety Question.

☐ This change does constitute an Unreviewed Safety Question and NNSA approval is required prior to implementation.

Complete the cover sheet summary.

Los Alamos
NATIONAL LABORATORY

memorandum

Los Alamos Neutron Science Center Division
LANSCE-6, Accelerator Operations and Technical Support Group

To/MS: M.J. Baumgartner, LANSCE-6, MSH840 4/20/05
From/MS: J. N. Knudson, LANSCE-6, MSH840
Phone/FAX: 667-2927/FAX 665-4049
Symbol: LANSCE-6-05-023
Date: April 21, 2005

SUBJECT: HAZARD ANALYSIS: FP12 LH_2 TARGET OPERATION IMPACT ON ACTINIDE EXPERIMENTS

The $\vec{n}p \rightarrow d\gamma$ experiment is authorized to be assembled and operated on the Lujan Scattering Center's flight path #12 (FP12) and will install a liquid hydrogen target as part of their experimental setup. This memo will identify, firstly, the hazards this target would present to actinide experiments, and secondly, the documentation produced by the experiment to support the conclusions reached in the first summary

Actinide Basis for Interim Operations (BIO)

The actinide BIO lists several Technical Safety Requirements for the performance of actinide experiments at the Lujan Center. Those that are relevant to this analysis are:

- High explosives may not be handled in the same room as actinide samples unless the actinides remain in their secured storage cabinet.
- A fire prevention program is to be in place to limit the amount of combustible material available to a building-wide fire, and to control ignition sources.

The bounding accident (highest consequence) in the BIO is a major building fire, which can arise from a number of causes, and is given a radiological consequence level of "low." The bounding initiator of the major building fire in terms of frequency is wildland fire, which is given a "high" frequency rating.

Interaction between the FP12 LH_2 target and actinide experiments

The FP12 LH_2 target will consist of a vacuum-jacketed target vessel, two closed-cycle helium cryocoolers, two vent lines (one to vent the target vessel, the other to vent the target enclosure), a gas-handling system and ancillary equipment located within the Lujan Center's Experimental Room 2 (ER-2; MPF-30). The target vessel will sit inside of a shielded enclosure. FP12 and the LH_2 target are in close proximity to where actinide experiments could be performed.

Hazard identification

The primary hazard presented by the operation of the proposed target is fire arising from an unplanned release of the hydrogen inventory of about 20 liquid liters. Hydrogen is combustible when mixed with air in concentrations between 4% and 76%. The danger presented by an uncontained release of hydrogen is compounded by hydrogen's very small ignition energy.

Hazard Mitigation:

The installation and operation of the LH_2 target at FP12 will preclude the use of actinide targets on FP12 itself. Therefore no actinide target will be co-located with the liquid hydrogen.

A committee of experts external to the experiment has reviewed the design of the FP12 target. This review concluded that the design for the target is sound and that the target should perform as expected. The design includes surrounding points vulnerable to hydrogen leakage, such as weld joints, with a helium jacket. This prevents the formation of a combustible mixture in the event of a leak. The target vessel itself is relatively thick and is not easily punctured.

Liquid hydrogen, although combustible, is not considered to be a high explosive. The target vessel will be isolated from the larger experimental room by a shielded enclosure which will make it very difficult for a fire within to escape or a fire without to enter. The control of combustible materials will be applied to the interior of the enclosure to the extent allowed by the needs of the experiment. Therefore, hydrogen operations may proceed in parallel with actinide experiments without violation of the BIO TSRs noted above.

Equipment Important to Safety:

The LH_2 target on FP12 will be operated independently from actinide experiments elsewhere in the facility. There will be no interaction between the LH_2 target and any equipment important to the safety of any actinide experiment.

Conclusions:

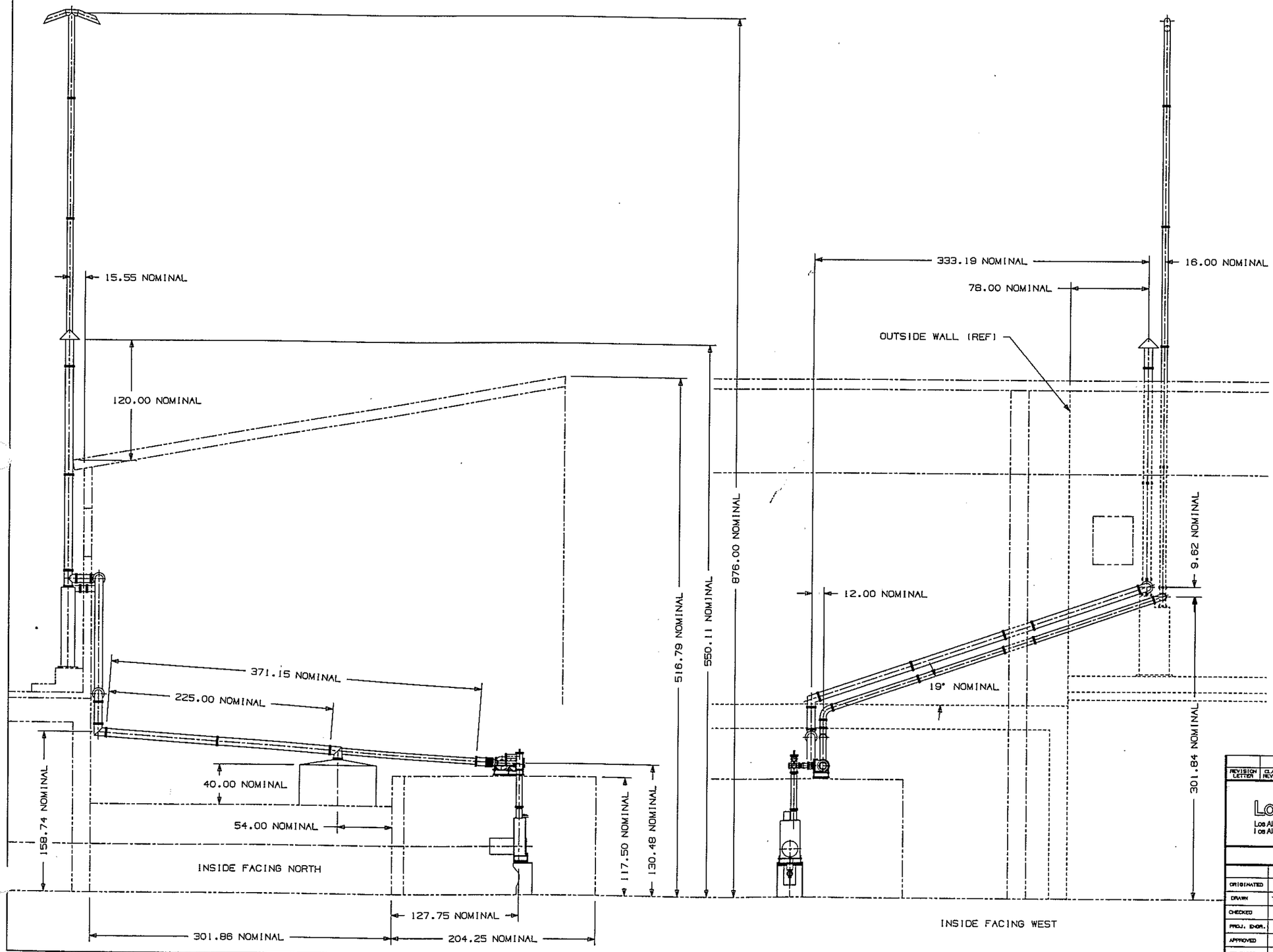
The operation of the liquid hydrogen target poses no additional radiological risk to the actinide experiments. The worst-case accident with the target remains bounded by the worst-case accidents analyzed in the Actinide BIO for both consequence and frequency.

Document summary:

Report of the target design review committee, December 4-5, 2001.
NPDGamma Liquid Hydrogen Target Engineering Document, June 10, 2004

JNK/jnk

Cy: 53-USQ-ER-05-019
LANSCE-6 File



REVISION LETTER	CLASS REVIEW	REVISIONS	DATE	CHANGED BY	CHECKED BY	APPROVED BY
		ORIGINAL ISSUE	—	—	—	—

Los Alamos
Los Alamos National Laboratory
Los Alamos, New Mexico 87545

CLASSIFICATION OF: DRAWING: UNC
PART: UNC TITLE BLOCK: UNC

TITLE
INSTALLATION RELIEF/VENT LINES NPDG HYDROGEN TARGET IN ER-2

	SIGNATURE	DATE	GROUP
ORIGINATED			
DRAWN	TEASDALE	02DEC04	P-23
CHECKED			
PROJ. ENGR.			
APPROVED			
RELEASED			

TOLERANCE-UNLESS OTHERWISE NOTED:
X± 1/32 0.XX ± .02 ANGULAR ± 1/2°
0.X ± .1 0.XXX ± .005 FINISH =

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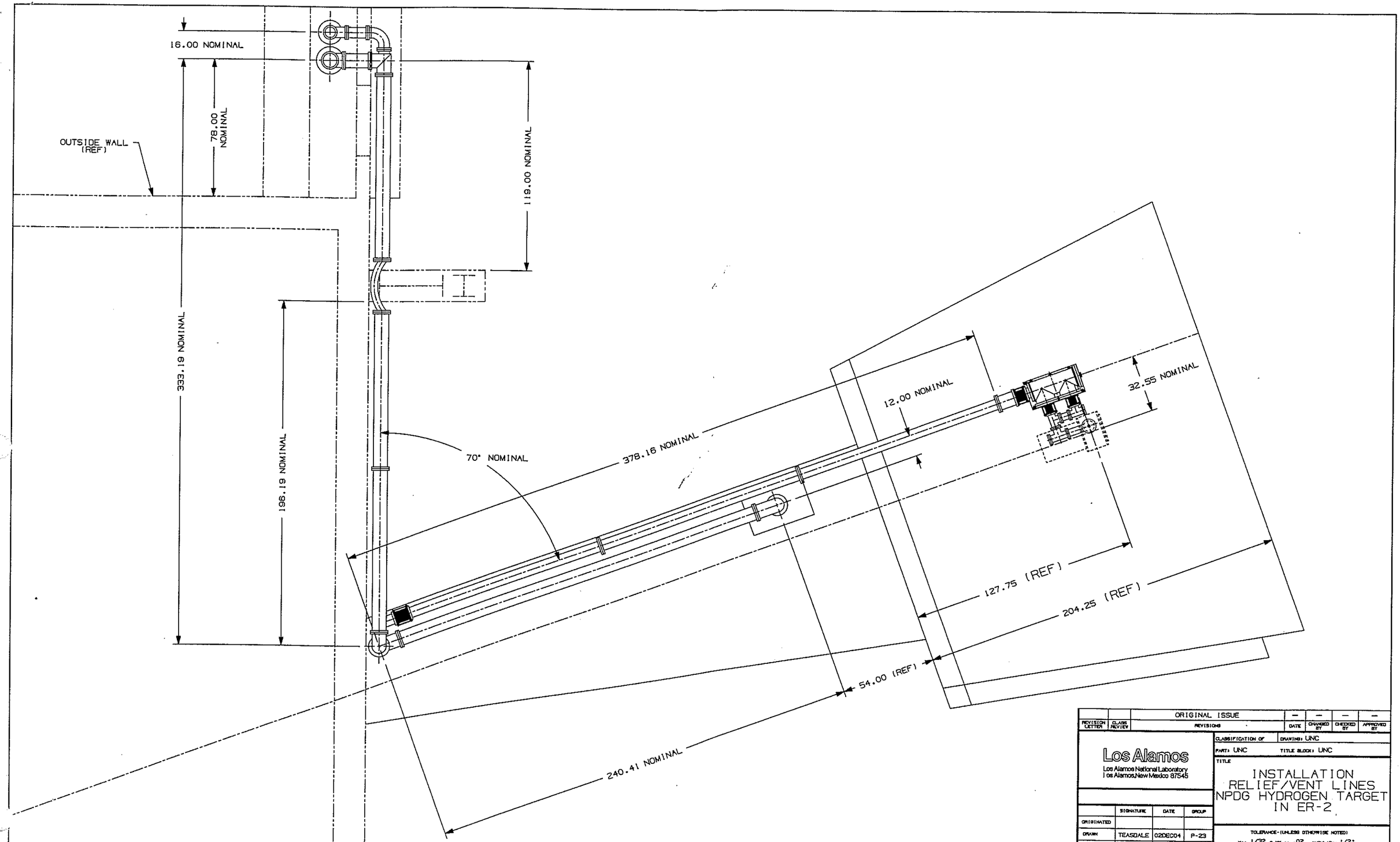

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Los Alamos, New Mexico 87545

	SIGNATURE	DATE	GROUP
ORIGINATED			
DRAWN	TEASDALE	02DEC04	P-23
CHECKED			
PROJ. ENGR.			
APPROVED			
RELEASED			

CLASSIFICATION OF: DRAWING: UNC
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TITLE
INSTALLATION RELIEF/VENT LINES NPDG HYDROGEN TARGET IN ER-2

TOLERANCE (UNLESS OTHERWISE NOTED)
X = 1/32 0.XX = ±.02 ANGULAR = 1/2°
0.X = ±1 0.XXX = ±.005 FINISH =

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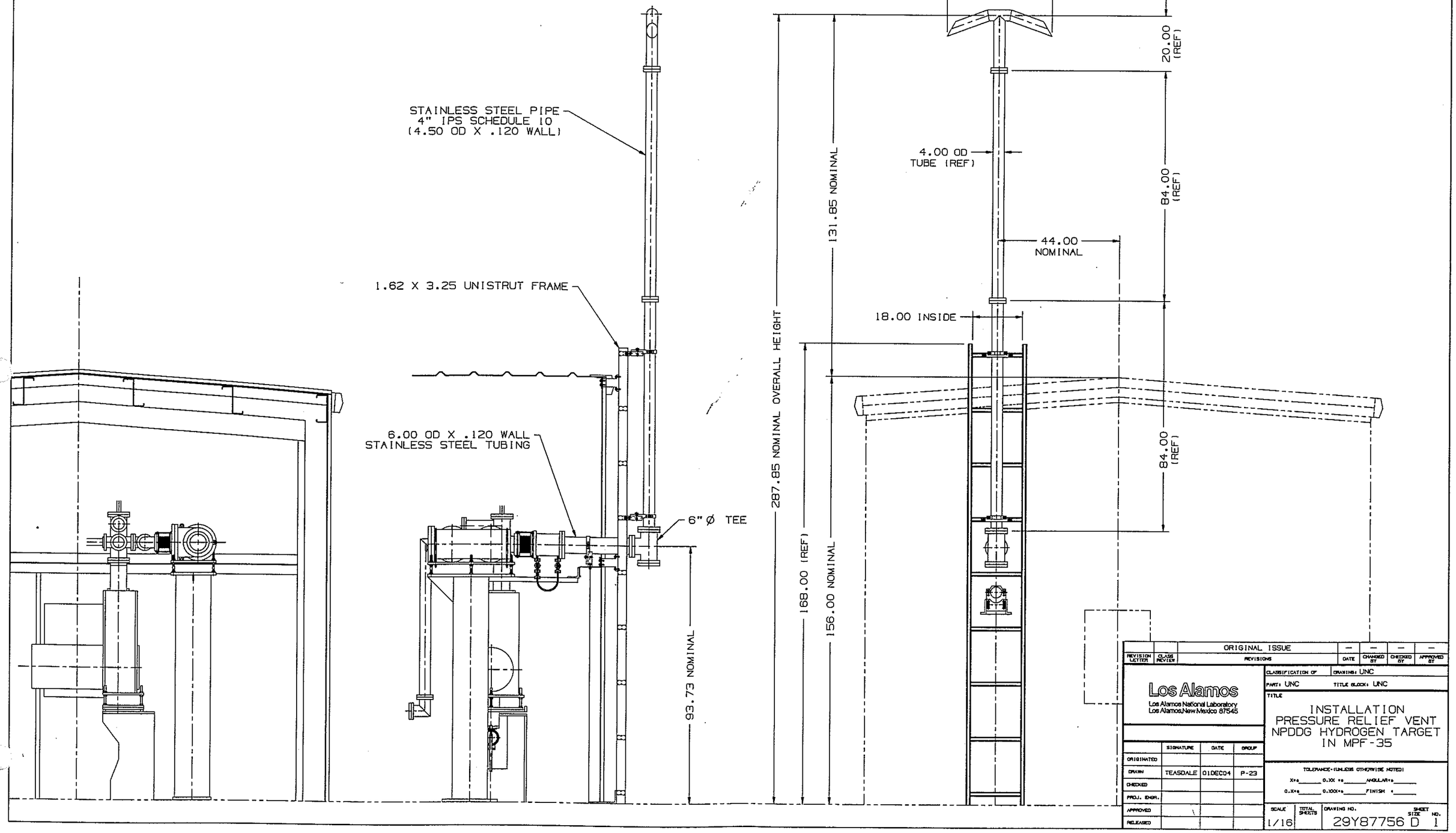

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Los Alamos, New Mexico 87545

CLASSIFICATION OF: DRAWING: UNC
PART: UNC TITLE BLOCK: UNC

TITLE

INSTALLATION PRESSURE RELIEF VENT NPDDG HYDROGEN TARGET IN MPF-35

	SIGNATURE	DATE	GROUP
ORIGINATED			
DRAWN	TEASDALE	01DEC04	P-23
CHECKED			
PROJ. ENGR.			
APPROVED			
RELEASED			

TOLERANCE (UNLESS OTHERWISE NOTED)
X ± ____ 0.XX ± ____ ANGULAR ± ____
0.X ± ____ 0.XXX ± ____ FINISH √ ____

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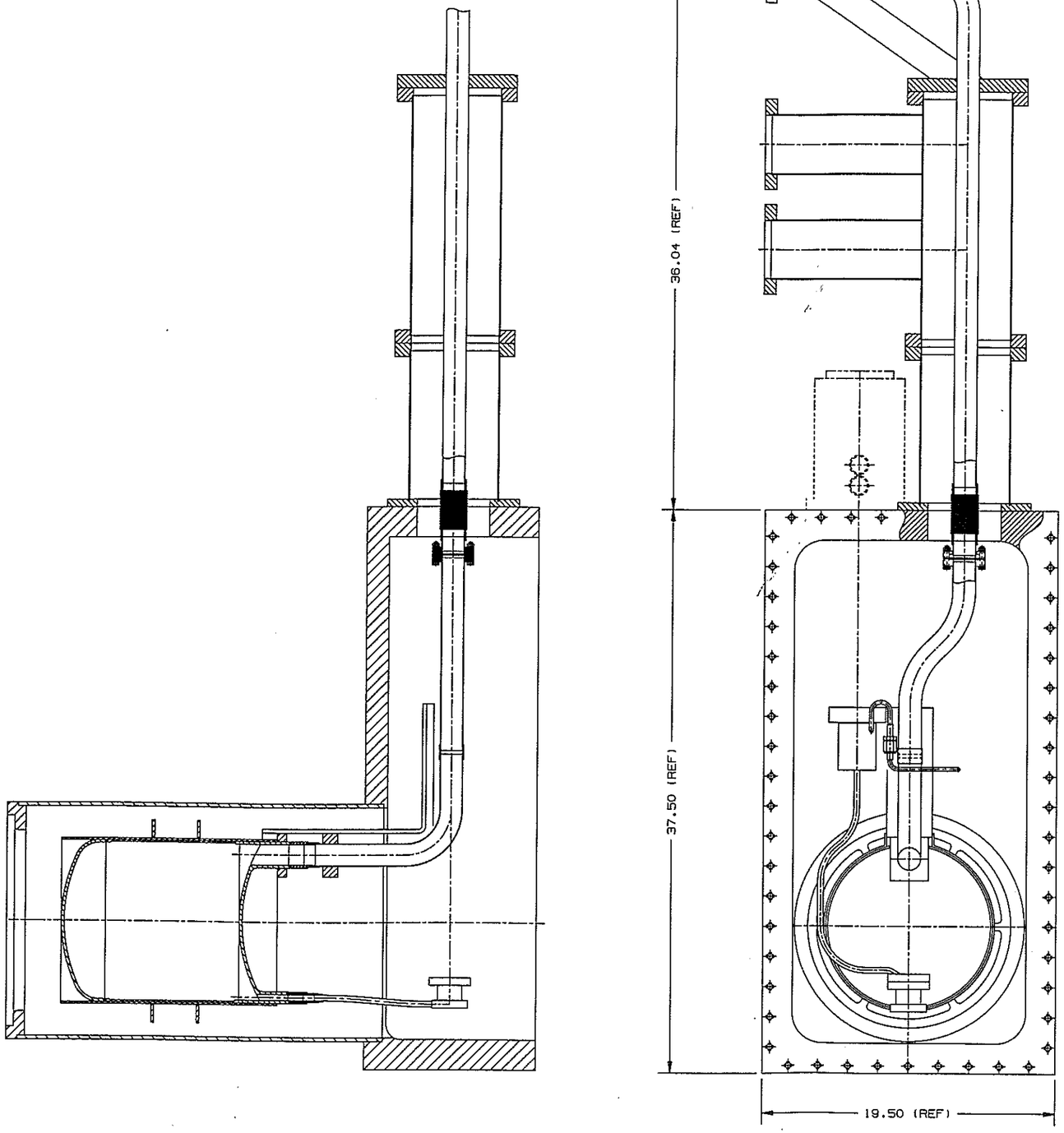

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PART: UNC TITLE BLOCK: UNC

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Los Alamos, New Mexico 87545

TITLE

INSTALLATION PIPING MODIFICATIONS NPDDG HYDROGEN TARGET

	SIGNATURE	DATE	GROUP
ORIGINATED			
DRAWN	TEASDALE	25OCT04	P-23
CHECKED			
PROJ. ENGR.			
APPROVED			
RELEASED			

TOLERANCE (UNLESS OTHERWISE NOTED)
X ± ____ 0.XX ± ____ ANGULAR ± ____
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SCALE	TOTAL SHEETS	DRAWING NO.	SHEET SIZE	NO.
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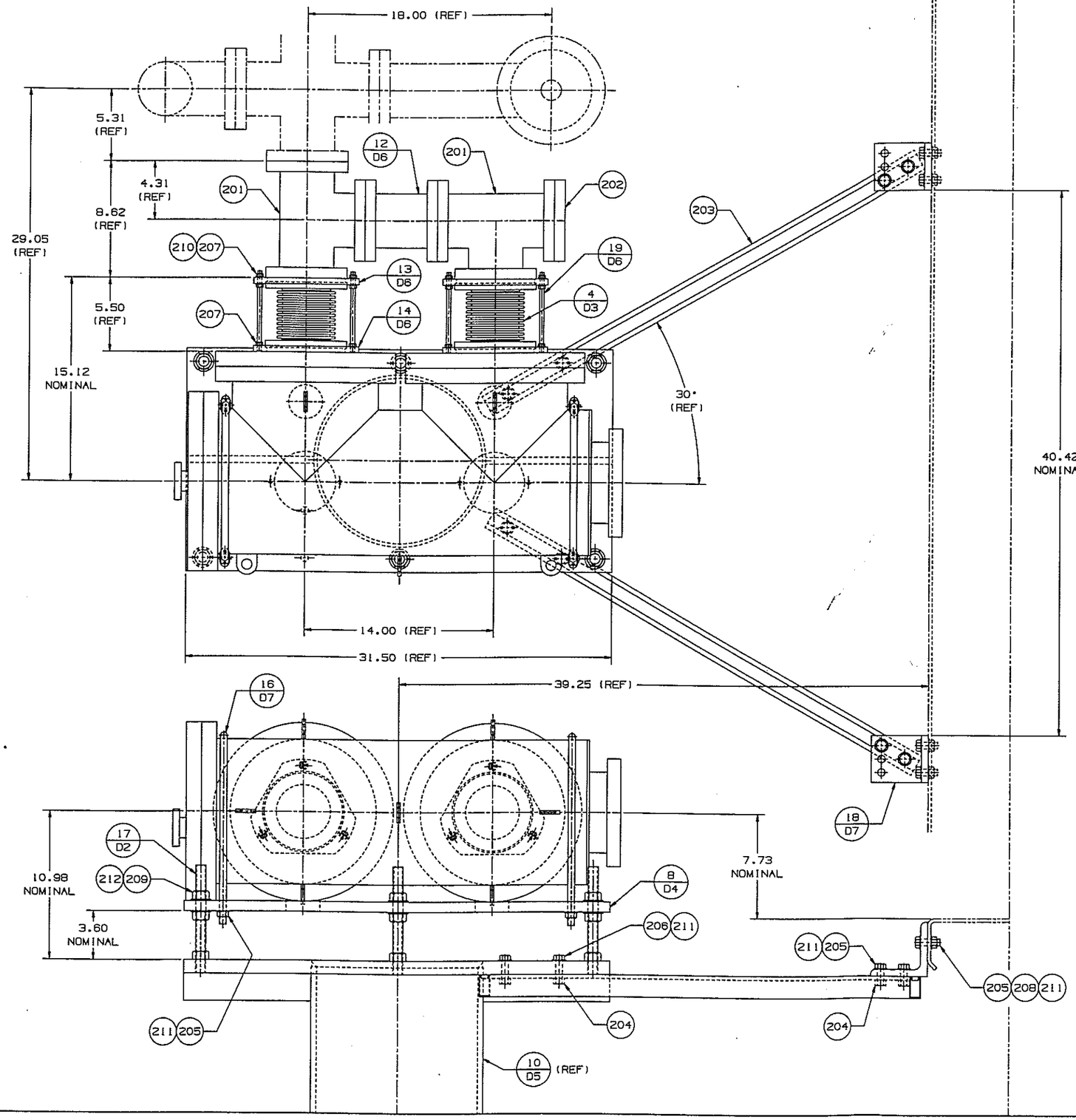

PARTS LIST

ITEM NUMBER	NUMBER REQD	DESCRIPTION
201	2	STAINLESS STEEL CONFLAT TEE, 6.00 FLANGE, MDC PART #404040 OR EQUAL
202	1	STAINLESS STEEL CONFLAT FLANGE, 6.00 OD BLANK, MDC PART #110025 OR EQUAL
203	2	UNISTRUT P1000 STEEL CHANNEL (1.62 SQUARE) X 36.50 LONG
204	8	UNISTRUT CHANNEL NUT WITH SPRING. 1/2-13, PART #P1010
205	8	1/2-13 X 1.50 LONG STEEL HEX HEAD CAP SCREW
206	4	1/2-13 X 2.00 LONG STEEL HEX HEAD CAP SCREW
207	18	5/16-18 STEEL HEX NUT
208	8	1/2-13 STEEL HEX NUT
209	18	3/4-10 STEEL HEX NUT
210	12	5/16 STEEL FLAT WASHER
211	20	1/2 STEEL FLAT WASHER
212	12	3/4 STEEL FLAT WASHER

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PART: UNC TITLE BLOCK: UNC

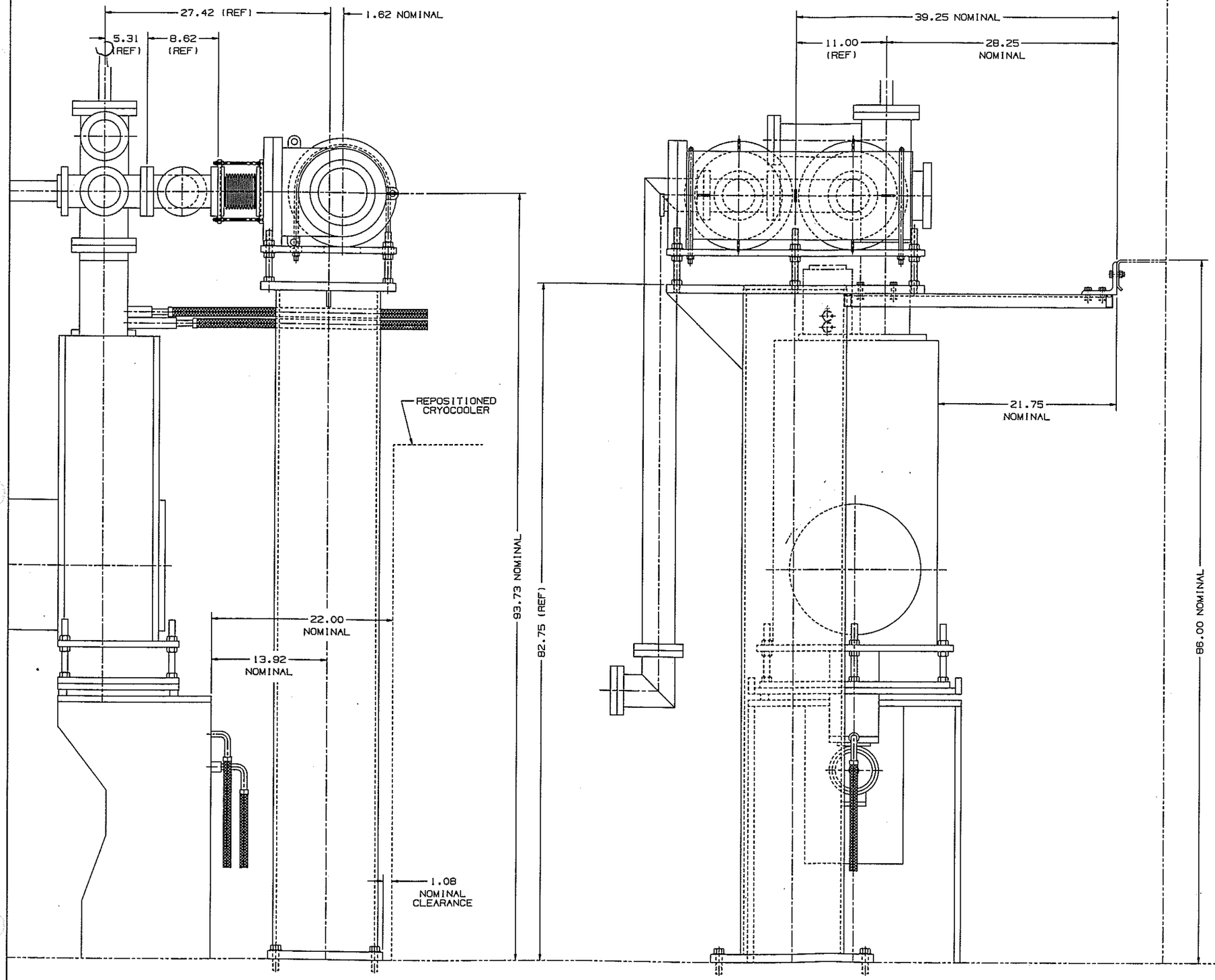
TITLE

INSTALLATION PRESSURE RELIEF MODULE NPDDG HYDROGEN TARGET

	SIGNATURE	DATE	GROUP
ORIGINATED			
DRAWN	TEASDALE	15JUN04	P-23
CHECKED			
PROJ. ENGR.			
APPROVED			
RELEASED			

TOLERANCE (UNLESS OTHERWISE NOTED)
X ± ____ 0.XX ± ____ ANGULAR ± ____
0.X ± ____ 0.XXX ± ____ FINISH ____

SCALE 1/4 | TOTAL SHEETS | DRAWING NO. 29Y87752 | SHEET SIZE D | SHEET NO. 2



REVISION LETTER	CLASS REVIEW	REVISIONS	DATE	CHANGED BY	CHECKED BY	APPROVED BY
		ORIGINAL ISSUE	—	—	—	—

Los Alamos
Los Alamos National Laboratory
Los Alamos, New Mexico 87545

CLASSIFICATION OF: DRAWING: UNC
PART: UNC TITLE BLOCK: UNC

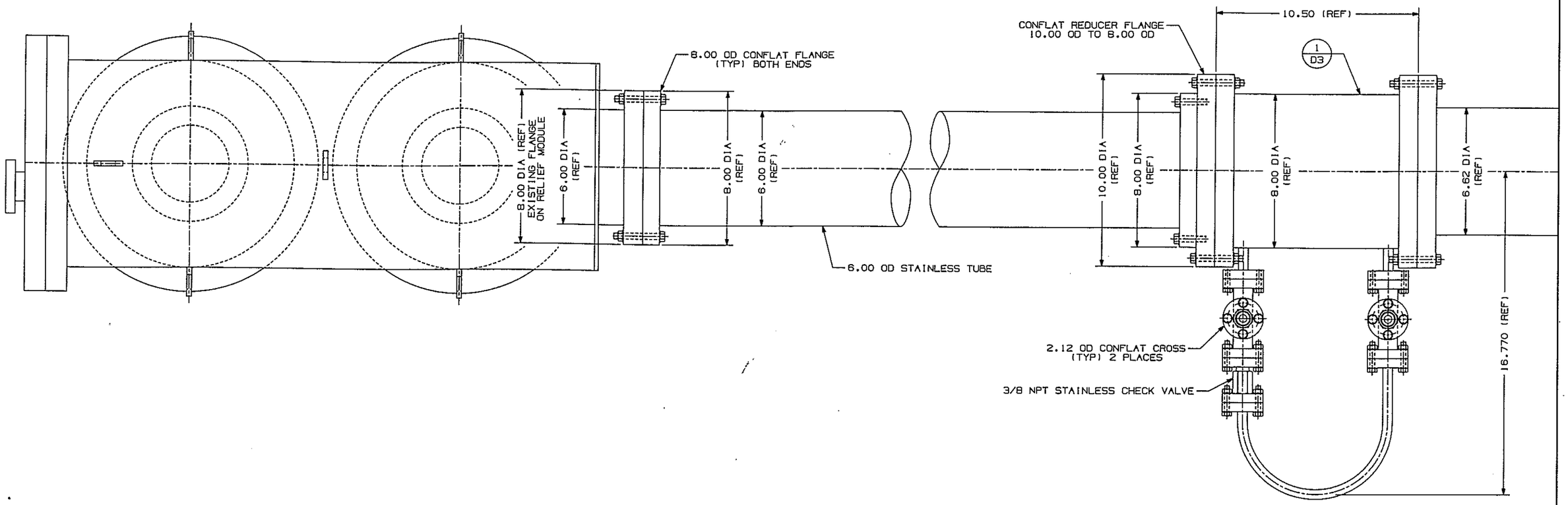
TITLE

INSTALLATION PRESSURE RELIEF MODULE NPDDG HYDROGEN TARGET

	SIGNATURE	DATE	GROUP
ORIGINATED			
DRAWN	TEASDALE	15JUN04	P-23
CHECKED			
PROJ. ENGR.			
APPROVED			
RELEASED			

TOLERANCE- (UNLESS OTHERWISE NOTED)
X ± ____ 0.XX ± ____ ANGULAR ± ____
0.X ± ____ 0.XXX ± ____ FINISH ± ____

SCALE	TOTAL SHEETS	DRAWING NO.	SHEET SIZE	SHEET NO.
1/6		29Y87752 D	1	



REVISION LETTER	CLASS REVIEW	REVISIONS	DATE	CHANGED BY	CHECKED BY	APPROVED BY
		ORIGINAL ISSUE	—	—	—	—

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Los Alamos, New Mexico 87545

CLASSIFICATION OF: DRAWING: UNC
PART: UNC TITLE BLOCK: UNC

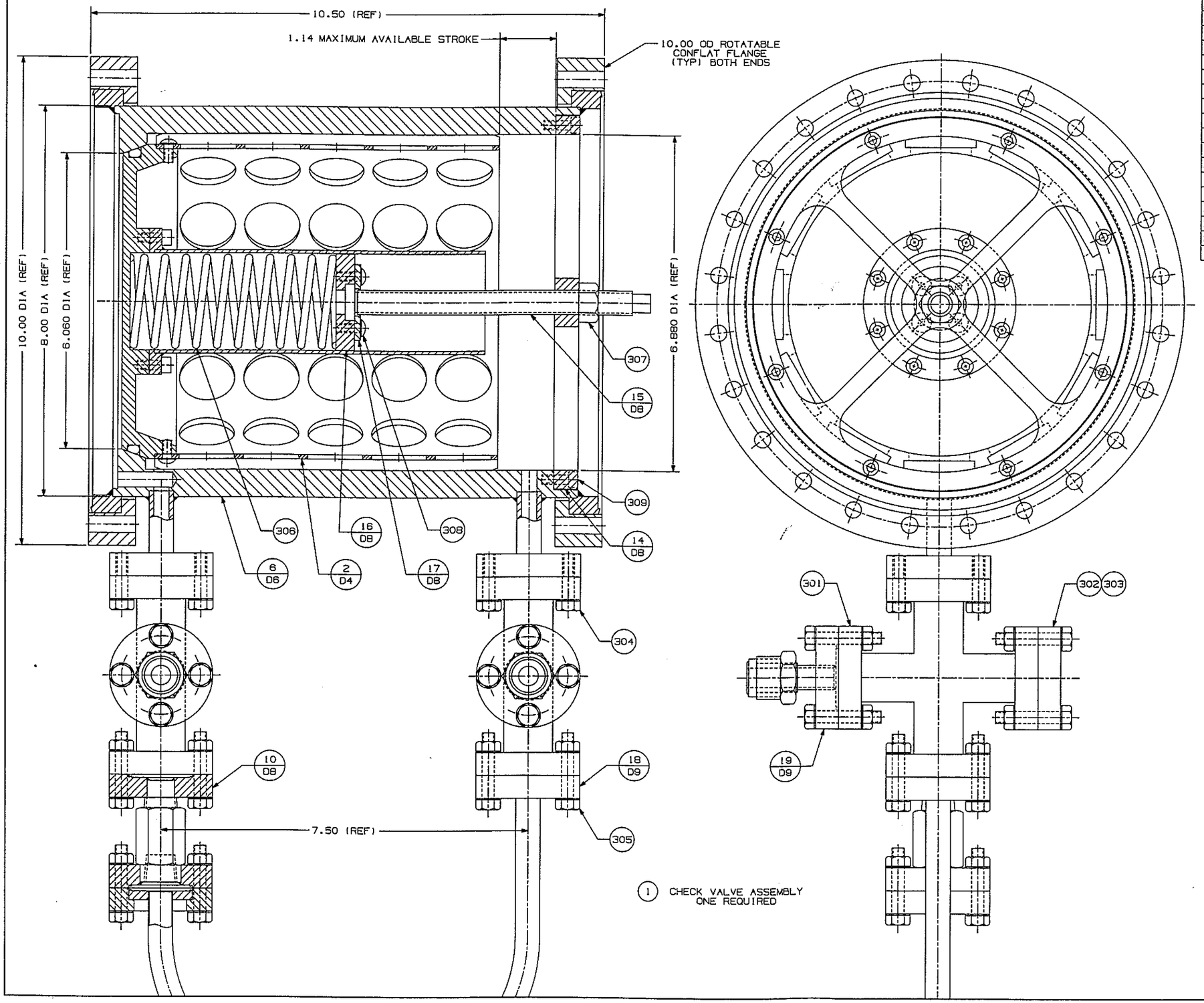
TITLE

INSTALLATION
CHECK VALVE ASSEMBLY
NPDG HYDROGEN TARGET

	SIGNATURE	DATE	GROUP
ORIGINATED			
DRAWN	TEASDALE	28JUN04	P-23
CHECKED			
PROJ. ENGR.			
APPROVED			
RELEASED			

TOLERANCE-(UNLESS OTHERWISE NOTED)
X=± 1/32 0.XX=± .02 ANGULAR=± 1/2°
0.X=± .1 0.XXX=± .005 FINISH = ____

SCALE	TOTAL SHEETS	DRAWING NO.	SHEET SIZE	SHEET NO.
.40		29Y87753	D	1



1 CHECK VALVE ASSEMBLY ONE REQUIRED

PARTS LIST		
ITEM NUMBER	NUMBER REQD	DESCRIPTION
301	2	STAINLESS STEEL CONFLAT CROSS, 2.12 OD FLANGE
		MDC PART #404001 OR EQUIVALENT
302	4	STAINLESS STEEL CONFLAT BLANK, 2.12 OD FLANGE
		MDC PART #110005 OR EQUIVALENT
303	2	COPPER GASKET FOR 2.12 OD FLANGE, PACK OF 10
		MDC PART #191002 OR EQUIVALENT
304	2	HEX HEAD BOLT SET FOR 2.12 OD TAPPED FLANGE
		MDC PART #190002 OR EQUIVALENT
305	8	HEX HEAD BOLT SET FOR 2.12 OD DRILLED FLANGE
		MDC PART #190004 OR EQUIVALENT
306	1	STAINLESS STEEL COMPRESSION SPRING
		1.937 OD X .148 WIRE DIA X 5.50 FREE LENGTH
		ASSOCIATED SPRING CATALOG #C1937-147-5500S
307	1	STAINLESS STEEL HEX JAM NUT, 1/2-13
308	4	STAINLESS STEEL BUTTON HD SCS, #10-32 X 3/8 LONG
309	8	STAINLESS STEEL SHCS, #10-32 X 1.2 LONG

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		ORIGINAL ISSUE	—	—	—	—

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CLASSIFICATION OF: DRAWING: UNC
PART: UNC TITLE BLOCK: UNC

TITLE
DETAILS
CHECK VALVE ASSEMBLY
NPDG HYDROGEN TARGET

	SIGNATURE	DATE	GROUP
ORIGINATED			
DRAWN	TEASDALE	28JUN04	P-23
CHECKED			
PROJ. ENGR.			
APPROVED			
RELEASED			

TOLERANCE (UNLESS OTHERWISE NOTED)
X ± 1/32 0.XX ± .02 ANGULAR ± 1/2°
0.X ± .1 0.XXX ± .005 FINISH ±

SCALE	TOTAL SHEETS	DRAWING NO.	SHEET SIZE	SHEET NO.
1/1		29Y87753	D	3