GPU Nuclear

GPU Nuclear Corporation
Post Office Box 480
Route 441 South
Middletown, Pennsylvania 17057-0191
717 944-7621
TELEX 84-2386
Writer's Direct Dial Number:

(717) 948-8461

October 21, 1987
4410-87-L-0127/0214P

USNRC-DS
1987 OCT 27 A 10:

US Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555

Dear Sirs:

Three Mile Island Nuclear Station, Unit 2 (TMI-2)
Operating License No. DPR-73
Docket No. 50-320
Defueling Canister Gas Sampling

The purpose of this letter is to request NRC approval to discontinue the long-term gas sampling program at the Idaho National Engineering Laboratory (INEL).

The NRC TMIOPD Letter NRC/TMI-87-003, dated January 7, 1987, approved a GPU Nuclear request to reduce the required canister void volume to 25% for fuel canisters and to levels assuring exposure of 25 grams of recombiner catalyst for filter and knockout canisters. The NRC approval was granted provided the following conditions were met:

1. Canisters would be dewatered to the maximum extent practical.

2. After shipping, confirmatory gas measurements would be taken on one (1) canister per shipment (i.e., one (1) of seven (7) for a single cask shipment, one (1) of 14 for a double cask shipment). A gas sample would be withdrawn and analyzed shortly after (i.e., within a few days) removal of the canister from the shipping cask at the INEL. Subsequently, the canister would be stored in an unvented condition for about six (6) weeks and resampled. The gas sample analysis would be used to confirm the conservatism in the projected allowable shipping window, as determined by comparison with gas samples withdrawn prior to shipping.

3. The sample results would be made available for NRC review upon request.

8710270348 871021
PDR ADOCK 05000320
P PDR

A001
1/1

REC'D W/CHECK
#007606

The intent of the long-term gas sampling program described above in item No. 2 is to verify 1) the catalyst recombiner is functioning under shipping conditions, 2) a combustible mixture of oxygen and hydrogen is not being shipped, and 3) the absence of an excessive pressure rise in the canisters due to a net hydrogen increase. Based on the justification provided below, GPU Nuclear believes that the long-term gas sampling program is no longer necessary.

To date, a total of eight (8) canisters have been sampled at INEL (several of the canisters have been sampled several times). Attachment 1 presents the gas sample results from both TMI and INEL in tabular form. This table provides the number of gas samples per canister at TMI and INEL, the number of days between samples, and the gas sample chemical analysis results. Attachment 2 graphically displays the gas sample data of Attachment 1. The graphs compare the percentage of hydrogen and oxygen present in the TMI and INEL samples as a function of the number of days after dewatering.

The following conclusions can be made from reviewing the attachments:

- At no time during the sampling program was a combustible mixture of gas approached.
- In each case, the sample results obtained at TMI are conservative in determining the gas appearance rate, i.e., if employing the single point straight line projection shown in Attachment 2, the safe storage time calculated using the TMI data is less than the safe storage time calculated using the INEL data.
- In all cases where oxygen scavenging was apparent, the hydrogen appearance rate was found to be less than 10 percent of the theoretical maximum used in previous analyses.
- A pressure increase due to net hydrogen production is not detectable. After dewatering, the canisters are overpressurized with argon to approximately 2 atm (29.4 psi). The highest canister pressure that has been observed at INEL is 29.33 psi (i.e., also approximately 2 atm). The canister design pressure is 150 psig.

GPU Nuclear believes that the data generated at INEL on the eight (8) canisters sampled, provides a sufficient data base to conclude that no safety hazards exist due to combustible gas mixtures or canister overpressurization. The safe shipment time calculated at TMI is more than adequate to meet the requirements of the NuPac 125B Certificate of Compliance (C of C) and the Canister Handling and Preparation for Shipment Safety Evaluation Report. Therefore, GPU Nuclear requests approval to discontinue the long-term sampling program at INEL.

Per the requirements of 10 CFR 170, an application fee of $150.00 is enclosed.

Sincerely,

Thomas G. Demmitt

for F. R. Standerfer
Director, TMI-2

CJD/eml

Attachment

Enclosed: GPU Nuclear Corp. Check No. 007606

cc: Regional Administrator, Region 1 - W. T. Russell
Director, TMI-2 Cleanup Project Directorate - Dr. W. D. Travers

TMI-2 GAS SAMPLE CANISTER INFORMATION

24-Sep-87
Page 01 of 03

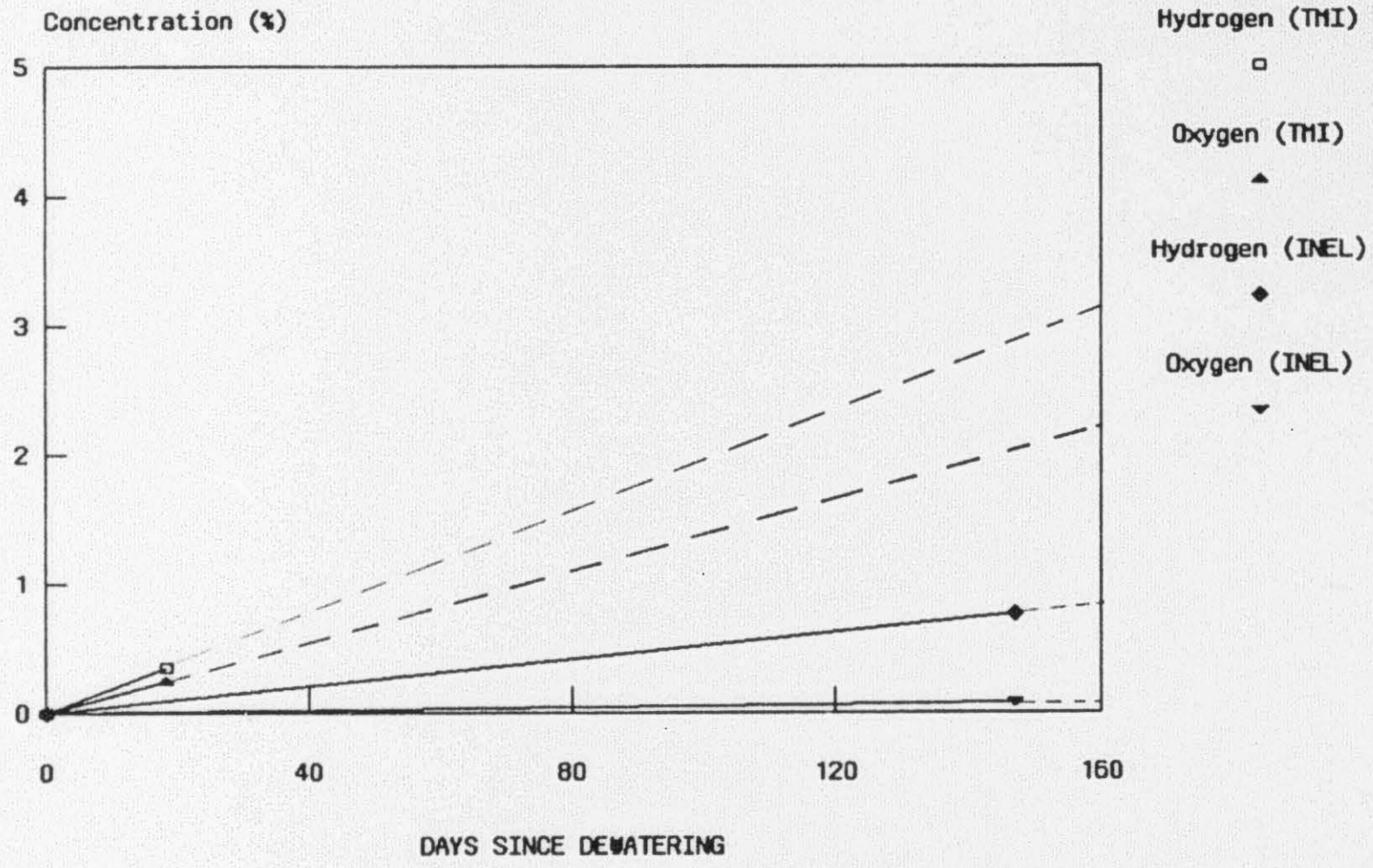
Cani. Head No.	Cask Ship No.	Rail Ship No.	Cani. Void Volume (ft3)	DeH2O Wt. (lbs)	Activity			Date	Days Moni-tored	Cani. Press-ure (psia)	Water Temp. (F)	Sample Cylin-der No.	Chemical Analysis (%) H2	N2	O2	Ar	CO2	He	Activ-ity	Days between Sample	Gas Vol Gen/Leak Rate (cc/hr)	Hydrogen Gen. Rate (cc/hr)	Comments
						1st DeH2O	post	07/14/86	0	29.49	72	N/A	N/A	N/A	N/A	N/A	N/A	N/A	TMI 1st to 2nd	12	N/A	N/A	Gas sampled for imforma-tion only.
							pre	07/26/86	12	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A					
						2nd DeH2O	post	07/26/86	0	N/A	N/A								TMI 2nd to Fin	18	N/A	1.43417	* Estimated value (Water temp. was not measured).
					T M I	Final DeH2O	pre	08/13/86	18	29.54	75	N/A	0.35	0.90	0.25	N/A	N/A	N/A					
D-144	003	--	3.38	2607			post	08/13/86		29.44	75												
						**	post	08/19/86	0	29.54 *	75								TMI to INEL	147	-4.8586	0.34893	** Re-pressurized to 15 psi for canister leakage.
						Start		01/13/87	147	26.33	68	2	0.77	0.90	0.08	98.2	0.03	N/A					
					INEL	Finish		01/13/87		26.33	68	3	0.77	0.90	0.07	98.2	0.03	N/A					Finished gas sampling.
						1st DeH2O	post	11/21/86	0	29.54	65	N/A	N/A	N/A	N/A	N/A	N/A	N/A	TMI 1st to 2nd	14	N/A	N/A	
						2nd DeH2O	pre	12/05/86	14	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A					
							post	12/05/86	0	29.54	65								TMI 2nd to Fin.	28	-11.192	2.21613	
					T M I	Final DeH2O	pre	01/02/87	28	28.24	68	N/A	1.03	<0.21	<0.12	N/A	N/A	N/A					
D-148	006	4	2.85	2781			post	01/02/87	0	29.52	68								TMI to INEL	26	-3.1999	2.73668	
						Start		01/28/87	26	29.13	68	2	1.14	0.35	0.07	98.4	0.05	N/A					
					I N E L	1st Finish		01/28/87		28.53	68	3	1.15	0.36	0.06	98.4	0.05	N/A	INEL 1st to 2nd	22	2.90904	0.94187	
						2nd Start		02/19/87	48	28.83	68	2	1.46	0.71	0.13	97.7	NEG	N/A					
						Finish		02/19/87		28.83	68	3	1.48	0.69	0.13	97.7	NEG	N/A					Finished gas sampling.
						1st DeH2O	post	01/15/87	0	29.44	65	N/A	N/A	N/A	N/A	N/A	N/A	N/A	TMI 1st to Fin.	8	-22.196	2.62754	Only one sample taken at INEL.
					T M I	Final DeH2O	pre	01/23/87	8	28.54	64	N/A	0.35	0.74	<0.11	N/A	N/A	N/A					
D-145	007	5	2.79	2776			post	01/23/87	0	29.54	64								TMI to INEL	27	-3.3707	1.67877	
						Start		02/19/87	27	29.33	68	4	0.74	0.59	0.09	98.6	NEG	N/A					
					INEL	Finish		02/19/87		29.33	68	5	0.74	0.58	0.09	98.6	NEG	N/A					Finished gas sampling.
						1st DeH2O	post	01/12/87	0	29.44	64	N/A	N/A	N/A	N/A	N/A	N/A	N/A	TMI 1st to Fin.	26	-6.7245	1.51960	
					T M I	Final DeH2O	pre	02/07/87	26	28.64	66	N/A	0.72	1.60	<0.2	N/A	N/A	N/A					
							post	02/07/87	0	29.38	66								TMI to INEL	27	N/A	N/A	* Gas pressure:Estimated value(for a defect of the pressure gage)
D-180	008	6	2.55	2899		Start		03/06/87	27	*18.33	68	2	1.19	1.04	0.13	97.60	0.02	N/A					
					I N E L	1st Finish		03/06/87		*18.33	68	3	1.27	1.10	0.13	97.40	0.03	N/A	INEL 1st to 2nd	178	0.99400	1.62703	
						2nd Start		08/31/87	205	19.33	70	10	9.05	3.73	<0.01	87.21	<0.01	<0.01					
						Finish		08/31/87		19.33	70	11	9.05	3.76	0.02	87.17	<0.01	<0.01					

Cani. Head No.	Cask Ship No.	Rail Ship No.	Cani. Void Volume (ft3)	DeH2O Wt. (lbs)	Activity		Date	Days Moni-tored	Cani. Press-ure (psia)	Water Temp. (F)	Sample Cylin-der No.	Chemical Analysis % H2	N2	O2	Ar	CO2	He	Activ-ity	Days between Sample	Gas Vol Gen/Leak Rate (cc/hr)	Hydrogen Gen. Rate (cc/hr)	Comments
					1st DeH2O	post	02/13/87	0	29.32	66	N/A	N/A	N/A	N/A	N/A	N/A	N/A	TMI 1st to Fin.	18	-3.2025	1.72717	
					T M Final	pre	03/03/87	18	29.04	66	N/A	0.52	0.44	<0.13	N/A	N/A	N/A					
					I DeH2O	post	03/03/87	0	29.5	66								TMI to INEL	36	-1.6083	1.67932	
D-162	009	7	2.74	2831		Start	04/08/87	36	29.33	68	4	1.01	4.29	1.00	93.62	0.07	0.01					
					I 1st	Finish	04/08/87		29.33	68	5	1.00	4.43	1.04	93.44	0.07	0.01	INEL 1st to 2nd	145	-1.5658	-0.0137	
					N E 2nd	Start	08/31/87	181	28.33	70	8	1.01	2.22	<0.01	96.73	0.02	0.01					
					L	Finish	08/31/87		28.33	70	9	1.01	2.22	<0.01	96.74	0.02	0.01					
					1st DeH2O	post	01/12/87	0	29.3	64	N/A	N/A	N/A	N/A	N/A	N/A	N/A	TMI 1st to 2nd	23	N/A	N/A	
						pre	02/04/87	23	N/A	65	N/A	N/A	N/A	N/A	N/A	N/A	N/A					
					2nd DeH2O	post	02/04/87	0	29.47	65								TMI 2nd to 3rd	3	-13.291	6.07350	
						pre	02/07/87	3	29.34	66	N/A	0.29	0.41	0.20	N/A	N/A	N/A					
					3rd DeH2O	post	02/07/87	0	29.33	66								TMI 3rd to 4th	24	0.98148	4.09782	
					T M	pre	03/03/87	24	29.44	66	N/A	1.56	0.42	0.12	N/A	N/A	N/A					
					I 4th DeH2O	post	03/03/87	0	29.36	66								TMI 4th to 5th	9	N/A	N/A	
D-188	010	7	2.85	2902		pre	03/12/87	9	N/A	67	N/A	0.70	1.90	0.50	N/A	N/A	N/A					
					5th DeH2O	post	03/12/87	0	29.39	67								TMI 5th to Fin.	4	N/A	N/A	
					Final	pre	03/16/87	4	N/A	68	N/A	0.40	0.70	0.20	N/A	N/A	N/A					
					DeH2O	post	03/16/87	0	29.36	68								TMI to INEL	16	-0.3999	4.55585	
						Start	04/01/87	16	29.33	68	4	1.16	0.49	0.05	98.27	0.01	N/A					
					1st	Finish	04/01/87		28.83	68	5	1.17	0.51	0.05	98.25	0.01	N/A	INEL 1st to 2nd	40	0	1.94503	
					I 2nd	Start	05/11/87	56	28.83	68	2	2.43	1.99	0.32	95.23	0.013	N/A					
					N	Finish	05/11/87		28.83	68	3	2.43	1.91	0.29	95.35	0.012	N/A	INEL 2nd to 3rd	32	-3.3332	1.56211	
					E L 3rd	Start	06/12/87	88	28.33	68	4	3.30	2.17	0.26	94.24	0.01	0.02					
						Finish	06/12/87		28.33	68	5	3.30	2.15	0.26	94.26	0.01	0.02					
					4th	Start	08/31/87	168	27.33	70	14	5.07	1.83	<0.01	93.09	<0.01	<0.01	to 3rd	80	-2.9420	1.19888	
						Finish	08/31/87		27.33	70	15	5.10	1.79	<0.01	93.11	<0.01	<0.01					

Cani. Head No.	Cask Ship No.	Rail Ship No.	Cani. Void Volume (ft3)	DeH2O Wt. (lbs)	Activity			Date	Days Moni-tored	Cani. Press-ure (psia)	Water Temp. (F)	Sample Cylin-der No.	Chemical Analysis % H2	N2	O2	Ar	CO2	He	Activ-ity	Days between Sample	Gas Vol Gen/Leak Rate (cc/hr)	Hydrogen Gen. Rate (cc/hr)	Comments
D-207	012	8	3.92		TIME	1st DeH2O	post	05/27/87	0	28.40	74	N/A	N/A	N/A	N/A	N/A	N/A	N/A	TMI 1st to Fin.	19	-53.444	6.46357	
						Final DeH2O	pre	06/15/87	19	25.04	77	N/A	1.70	<0.30	<0.20	N/A	N/A	N/A					
							post	06/16/87	0	29.34	77								TMI to INEL	20	7.07696	0.86060	
					INEL 1st	Start		07/06/87	20	29.33	68	4	0.20	0.48	0.04	93.40	0.13	5.70					
						Finish		07/06/87	0	28.33	68	5	0.20	0.47	0.04	93.40	0.13	5.70	INEL 1st to 2nd	56	-5.7807	0.35935	
					INEL 2nd	Start		08/31/87	56	27.33	70	6	0.46	3.73	0.69	89.76	0.08	5.28					
						Finish		08/31/87	76	27.33	70	7	0.46	3.90	0.74	89.55	0.07	5.28					
D-267	013	9	4.21		TIME	1st DeH2O	post	07/06/87	0	28.90	75	N/A	<0.01	<0.17	0.19	N/A	N/A	N/A	TMI 1st to Fin.	8	-35.468	0	
						Final DeH2O	pre	07/14/87	8	28.04	76	N/A	<0.007	2.46	0.69	N/A	N/A	N/A					
							post	07/15/87	0	29.33	75								TMI to INEL	22	-3.9940	0.47222	
					INEL 1st	Start		08/06/87	22	28.83	71	2	0.11	3.90	0.95	95.00	0.01	0.05					
						Finish		08/06/87	0	28.83	71	3	0.12	0.90	0.17	98.80	<0.01	0.05	INEL 1st to 2nd	25	-18.153	0.44244	
					INEL 2nd	Start		08/31/87	25	27.33	70	12	0.25	0.51	0.01	99.18	<0.01	0.06					
						Finish		08/31/87	[illegible]	27.33	70	13	0.25	0.52	0.01	99.16	<0.01	0.06					

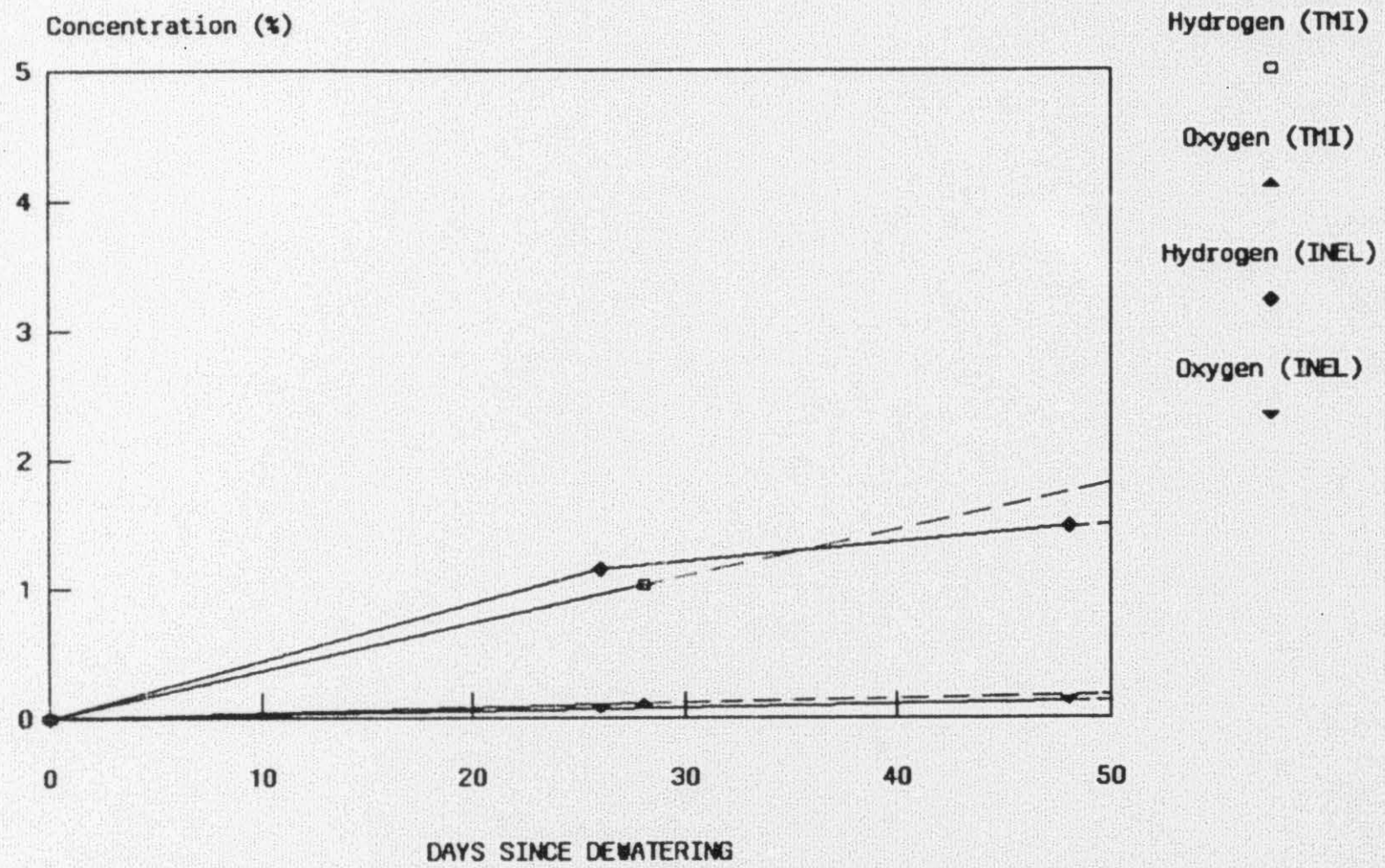
HYDROGEN / OXYGEN GENERATION

D-144



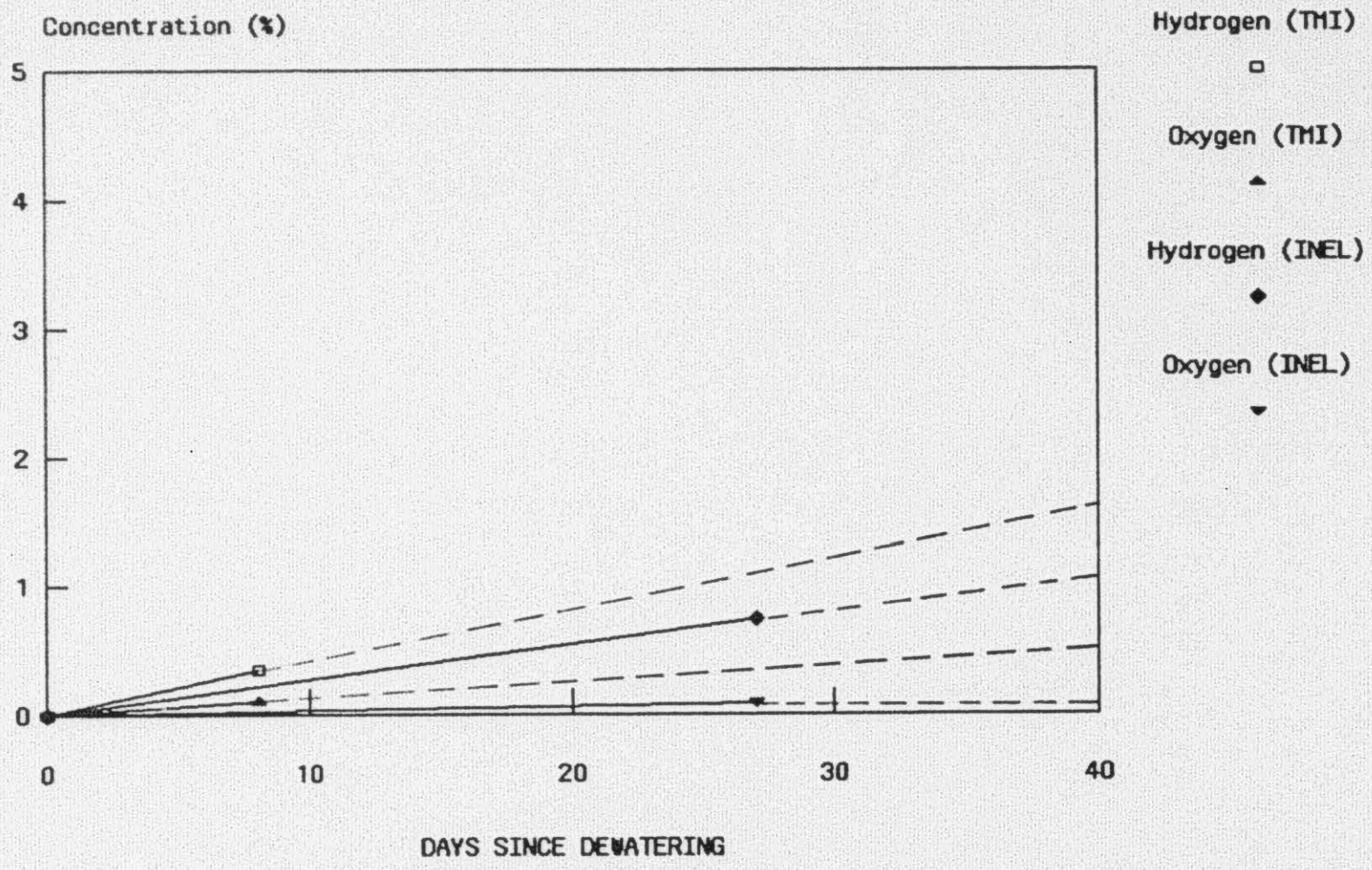
HYDROGEN / OXYGEN GENERATION

D-148



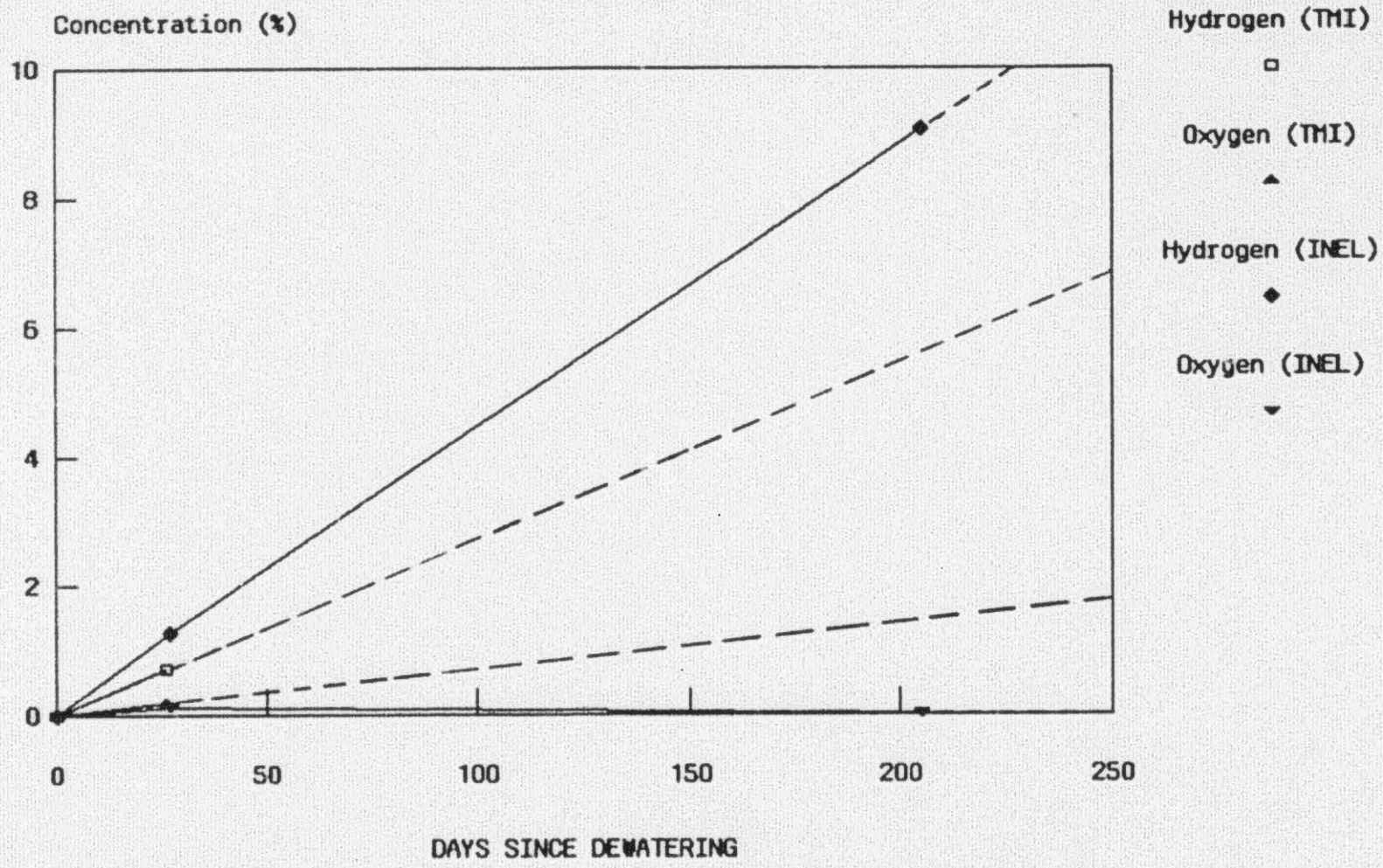
HYDROGEN / OXYGEN GENERATION

D-145



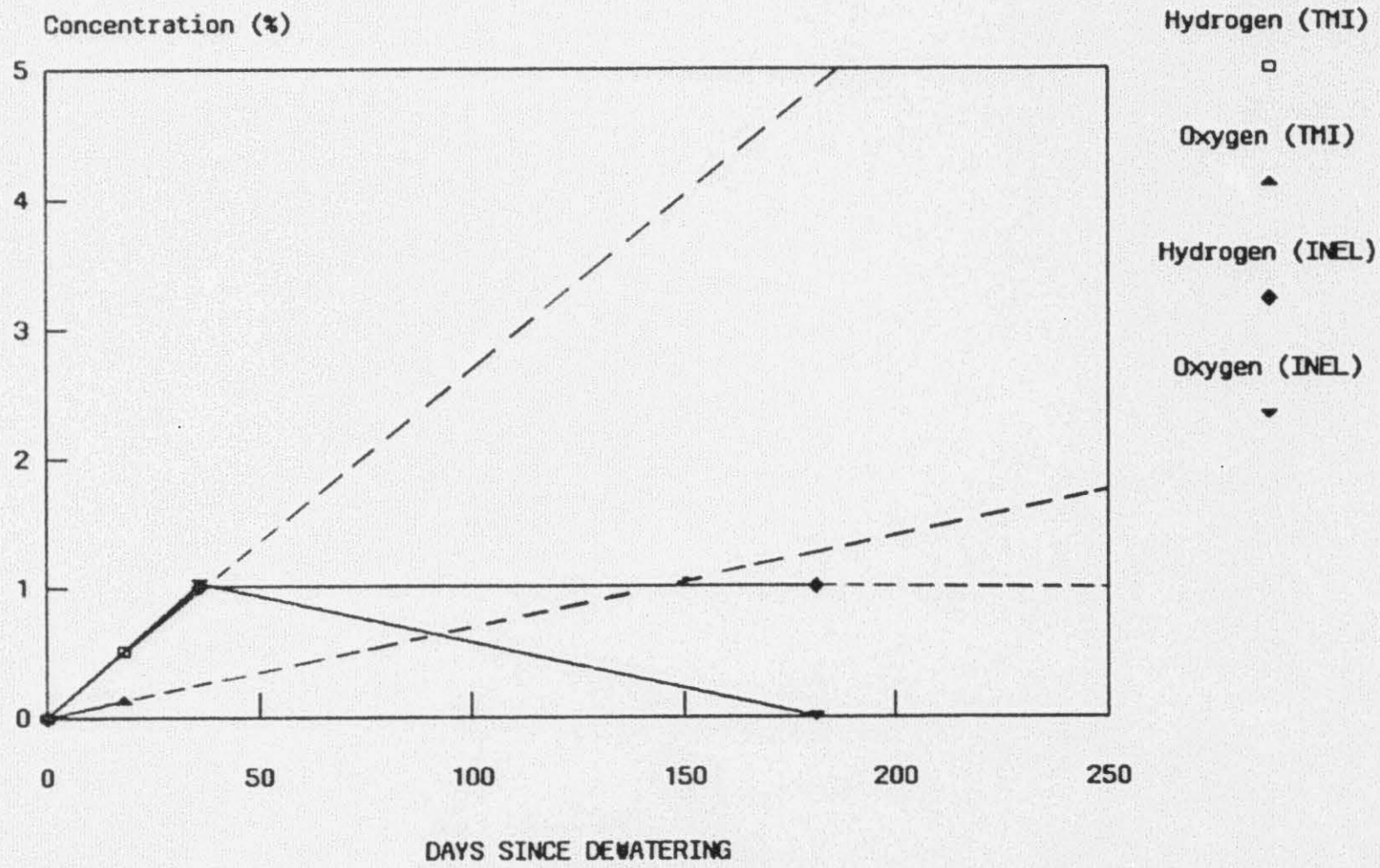
HYDROGEN / OXYGEN GENERATION

D-180



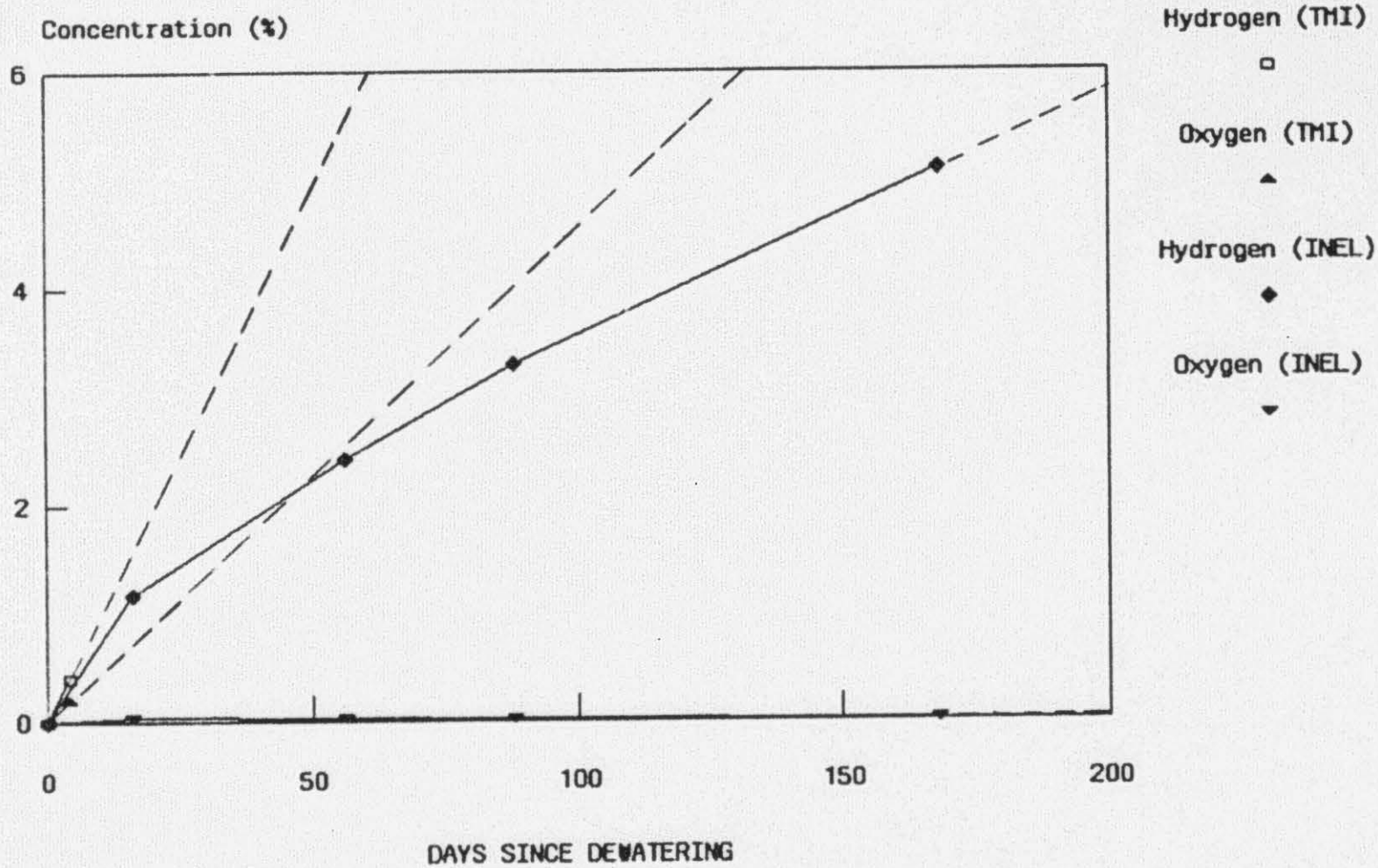
HYDROGEN / OXYGEN GENERATION

D-162



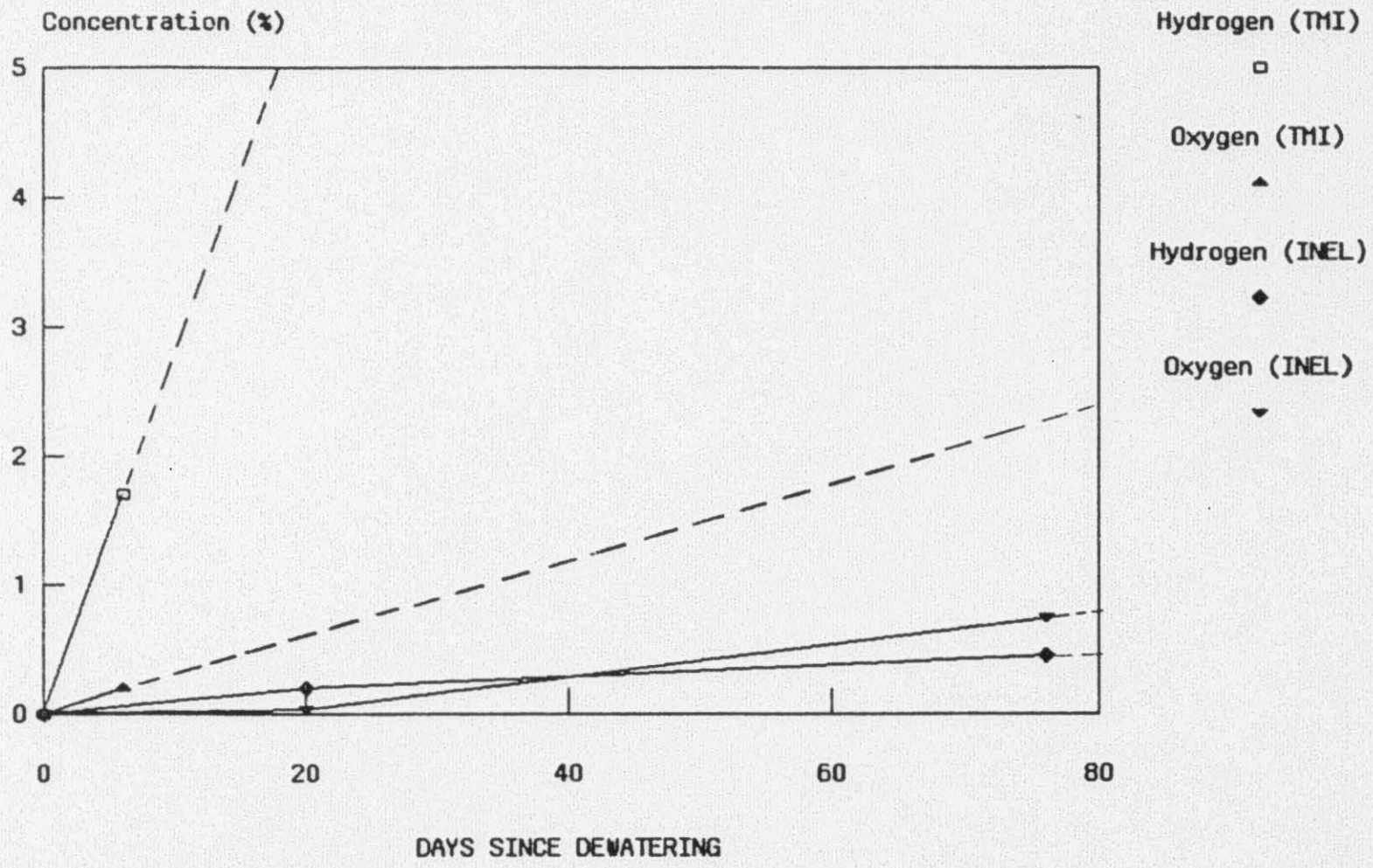
HYDROGEN / OXYGEN GENERATION

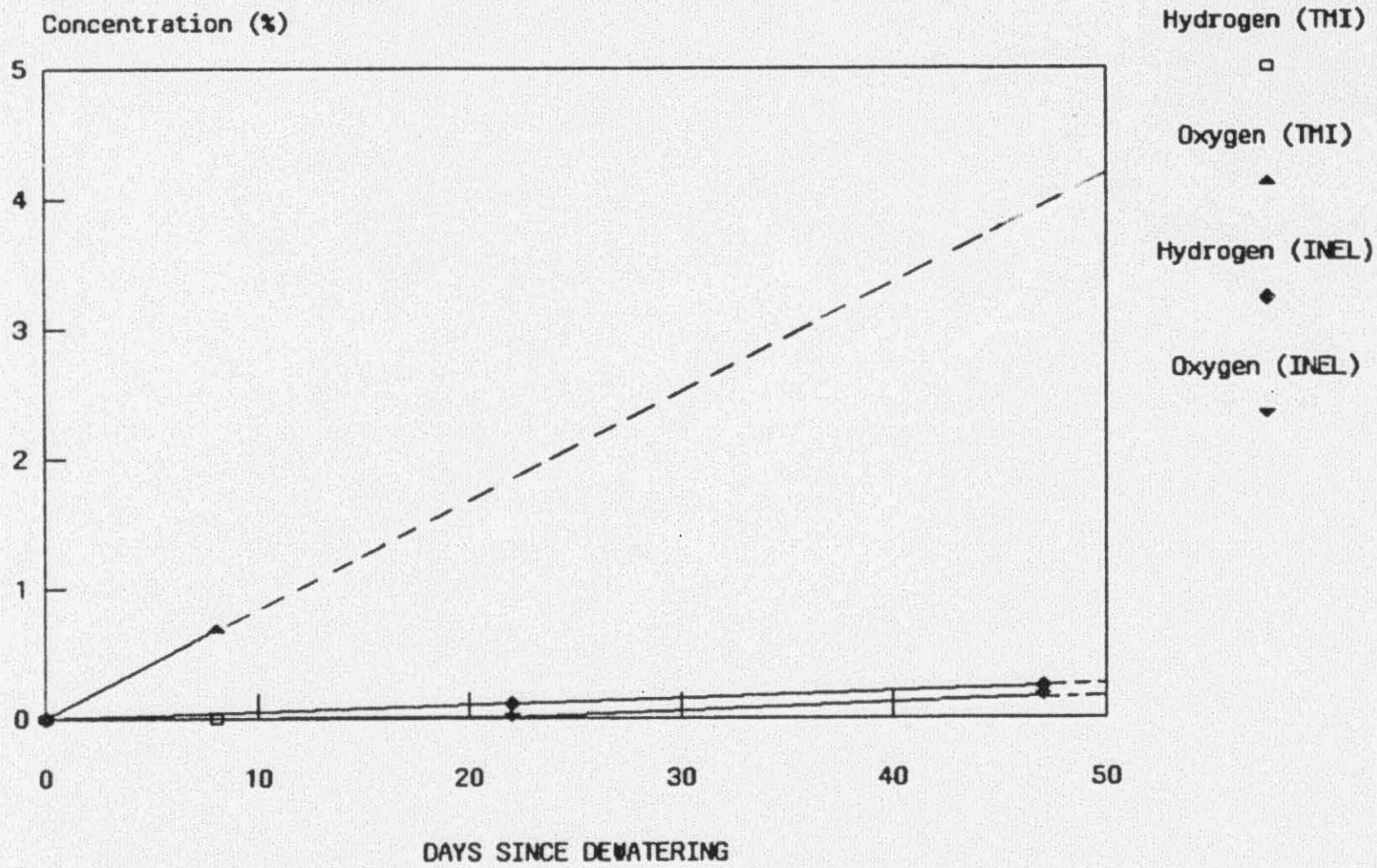
D-188



HYDROGEN / OXYGEN GENERATION

D-207



HYDROGEN / OXYGEN GENERATION

D-267