



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

May 1, 1996

Docket File

52-003
52-004

APPLICANT: GE Nuclear Energy (GE)
Westinghouse Electric Corporation

PROJECT: SIMPLIFIED BOILING WATER REACTOR (SBWR) DESIGN CERTIFICATION
REVIEW ADVANCED PASSIVE (AP600) DESIGN CERTIFICATION REVIEW

SUBJECT: SUMMARY OF MEETING HELD WITH GE AND ANSALDO AND WESTINGHOUSE AND
ANSALDO TO DISCUSS TOPICS RELATED TO THE QUALITY ASSURANCE (QA)
PRACTICES OF ANSALDO RELATED TO TEST ON THE AP600 AND SBWR DESIGNS

On March 5 through 8, 1996, the staff completed a QA inspection of the SBWR PANDA test facility at the Paul Scherrer Institut in Würenlingen, Switzerland. Following their work in Switzerland, four members of the staff Messrs. McIntyre, Peralta, Levin, and Scaletti met with representatives of GE, Westinghouse, and Ansaldo in Genova, Italy to discuss Ansaldo QA practices as they related to tests on the SBWR and AP600 designs. The meetings were held in three parts - a combined meeting with GE, Westinghouse, and Ansaldo to discuss general QA practices then following with vendor specific meetings to discuss design specific issues. The agenda for the meetings is provided in Attachment 1.

The Ansaldo Nuclear Division appears to have a well-developed QA program which was originally developed based on the NQA-1 standard. The Ansaldo QA program manual incorporates elements of ANSI/ASME NQA-1, IAEA 50-C-QA, and ISO-9001. For projects where Ansaldo contracts to another company, including Ansaldo Componenti in Milano, Italy, the QA requirements are specified by the customer. The Ansaldo Nuclear Division, as contractors for AP600 and SBWR test programs, has been audited by both GE and Westinghouse. There have been two GE audits and three Westinghouse audits conducted since October 1990. From these 5 audits, only four nonconformances were identified. Both Westinghouse and GE committed to implement an NQA-1 QA program for design certification testing; this commitment extended to their contractors and partners. The presentation material for the combined portion of the meeting is provided in Attachment 2.

With regard to AP600, the staff initially focused on the VAPORE facility modification that was performed between the ADS Phase A (sparger) and Phase B1 (valve/piping network) test programs. The contracts for the work on VAPORE for Phases A and B1 were between Ansaldo and ENEA. According to Ansaldo, no specific QA requirements were included in these contracts; rather, "best engineering practice" was specified. The staff was informed that even though no QA requirements were specified, the Ansaldo QA program was implemented for its AP600 activities. The presentation material for the AP600 discussions is provided in Attachment 3.

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With regard to the SBWR activities, the Ansaldo Nuclear Division in conjunction with Ansaldo Componenti designed and fabricated the passive containment cooling system (PCCS) and isolation condenser (IC) prototype heat exchangers tested in the PANTHERS facility at SIET Laboratories. Ansaldo clarified that the IC and PCCS prototypes had been fabricated under the Ansaldo Nuclear Division's QA program but that as they were experimental units some deviations from the ASME Boiler and Pressure Vessel Code had been incorporated in order to accommodate test and diagnostic instrumentation ports. Once the prototype heat exchangers are successfully qualified for use in a certified design, the staff anticipates that the fabrication of the actual components would be performed at a location authorized by ASME as an N-Stamp Certificate holder. For Ansaldo, their Componenti facility in Milano, Italy is the ASME N-Stamp Certification holder.

Both of these heat exchangers experienced some leakage during testing; the PCCS heat exchanger leaked during thermal-hydraulic performance tests, and the IC heat exchanger leaked after completion of the thermal-hydraulic testing during the subsequent structural testing. GE informed the staff that work was ongoing to understand the cause of the leakage and potential design solutions; however, they believed that amount of leakage during the PCCS thermal-hydraulic tests was so small that it did not to affect the results of the tests. Once the reasons for the leakage are determined, design fixes will be evaluated. The presentation material for the SBWR meeting is provided in Attachment 4.

The staff's report for the audit of the PANDA tests is scheduled to be issued by the end of April.

original signed by:

Dino C. Scaletti, Project Manager
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 Office of Nuclear Reactor Regulation

Docket Nos. 52-003
 and 52-004

Attachments: As stated

cc w/attachments:
 See next page

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DATE	04/29/96		04/11/96					

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Docket No. 52-003
Docket No. 52-004

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ANSALDO

Concilio Provincial 1

01/07/1981

FINMECCANICA

Energy

- Power generation plants
- Components
- Service

Transportation

- Transportation systems
- Signalling
- Traction

Automation

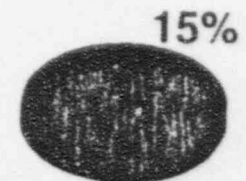
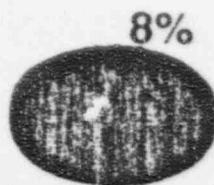
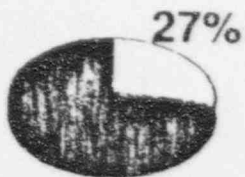
- Process automation
- Industrial automation
- Service automation

Aerospace

- Aeronautics
- Space and telecommunications

Defence

- Missiles systems
- Radar systems
- Avionics & simulators
- Naval systems



COMPANY STRUCTURE 1994

Systems
 Components
 Service
 Nuclear power

Cogeneration
 Transmission
 and distribution

Electrical systems
 and automation

Transportation
 systems
 Signalling
 Automation
 Vehicles
 Power Supply

Technological
 systems
 Information
 systems

ANSALDO

ANSALDO ENERGIA

Ansaldo Gls
 Termosud
 F. Toel Ingegneria

ANSALDO INDUSTRIA

Ansaldo Bmb
 Ansaldo Loire Aut.
 Bmb / Iee
 Concol Systems
 Hill Graham Controls
 Ieg
 Microelettrica Solent. (*)
 Ansaldo Rose Hill
 Wertel
 Ansaldo Volund
 Sagem
 Ansaldo Ind. of America
 Ansaldo Tecnitalia
 Aerimpianti
 Sernagiotto

ANSALDO TRASPORTI

At Signalling
 At Signal System
 Cese Transport (*)
 Firema (*)
 Segnalamento Ferr.
 Transystem
 Union Switch & Signal

Ansaldo International
 Ael
 Ceeen
 Sni
 Ansaldo Fiberoche
 Anit
 Cio
 Coesma Ansaldo
 Gertz Ansaldo
 Sopren

— Energy
 — Industry
 — Transportation
 Support activities and other

(*) Minority shareholdings

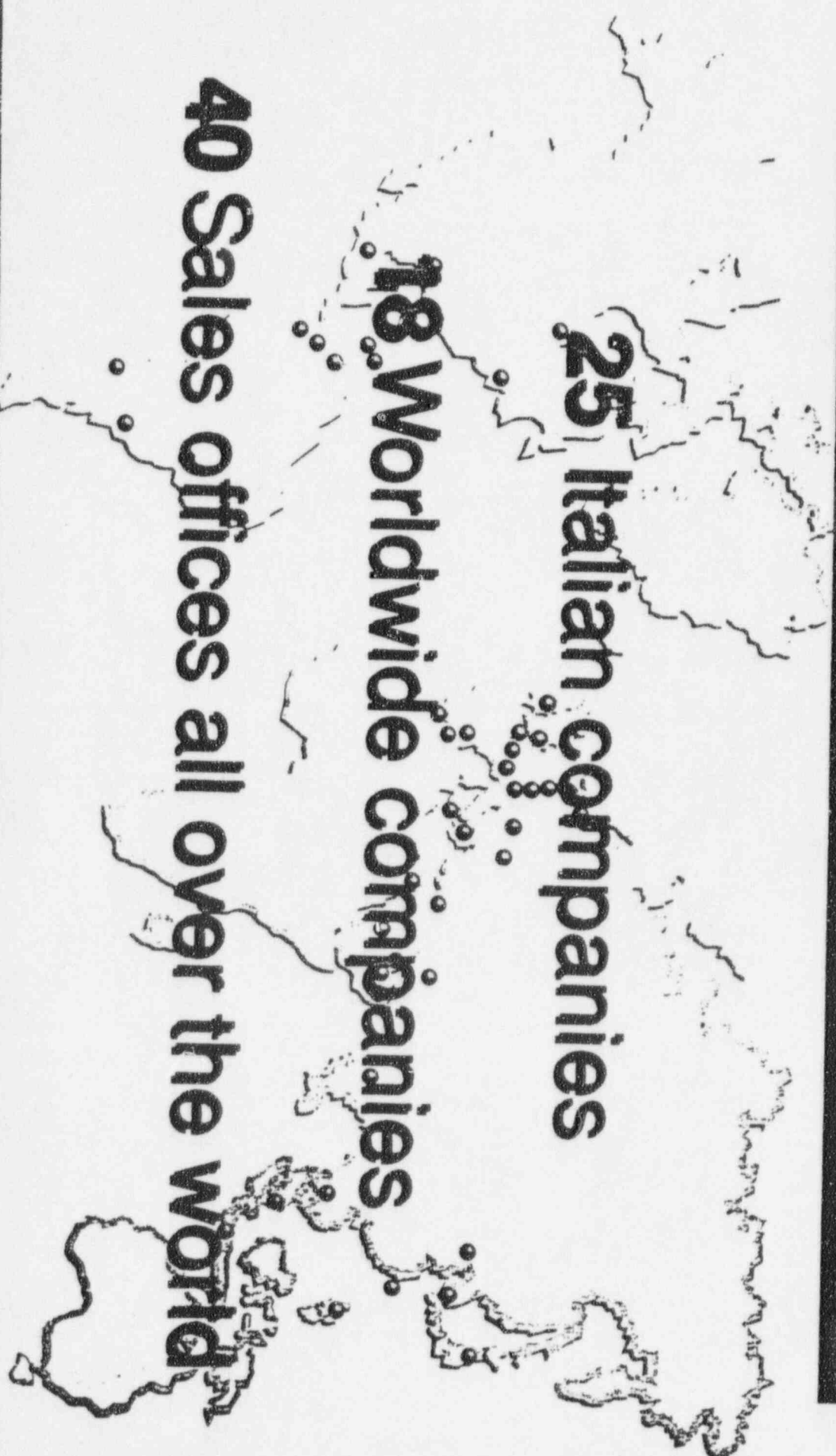
ANSALDO

WORLDWIDE ORGANIZATION

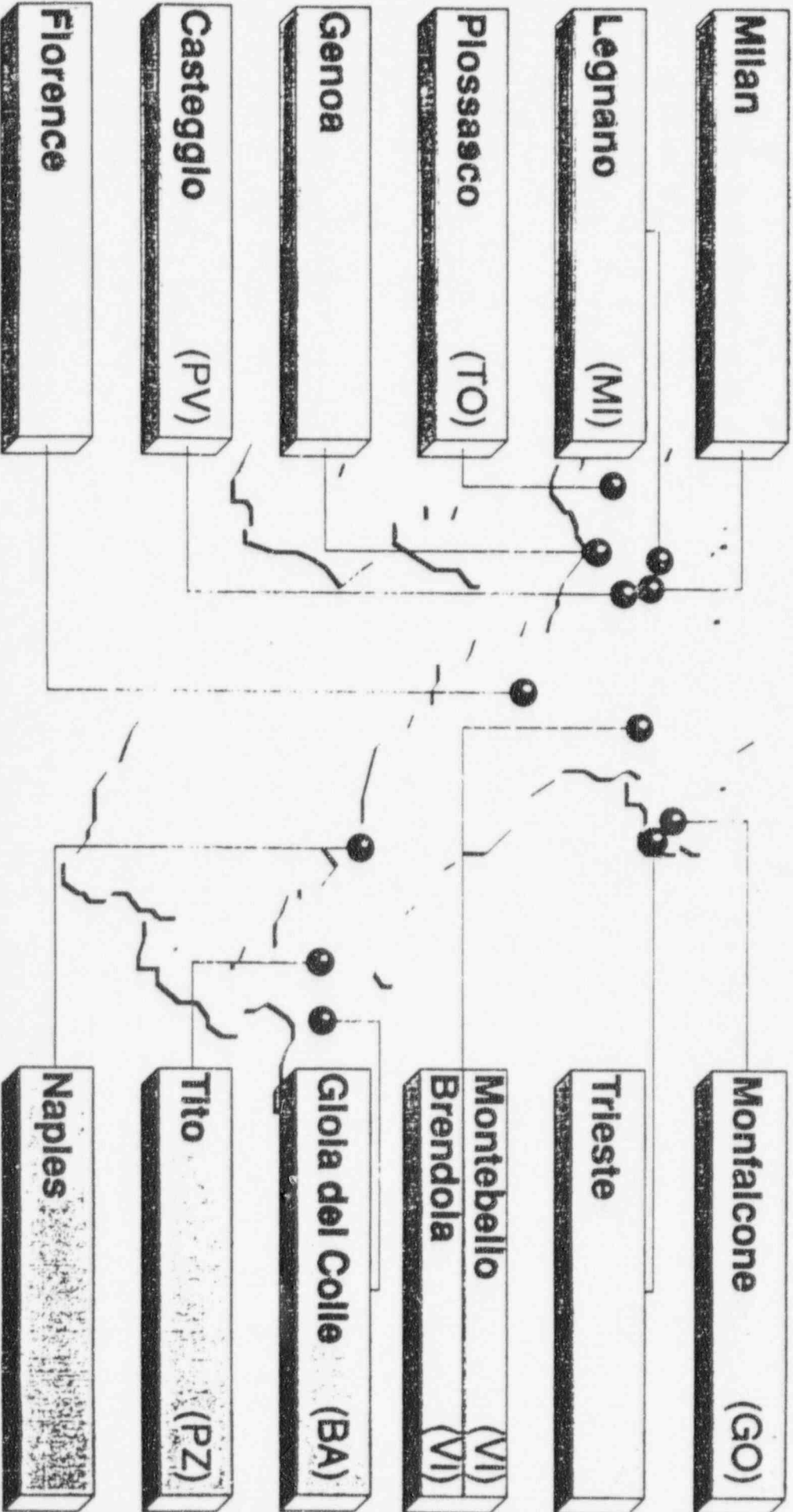
25 Italian companies

18 Worldwide companies

40 Sales offices all over the world



FACTORIES IN ITALY



NUCLEAR DIVISION

THE MISSION:

- REAFFIRM THE ROLE OF PRIMARY INTERNATIONAL COMPANY IN NUCLEAR TECHNOLOGY SUPPLIES.
- CONTRIBUTE TO REVIVE THE NUCLEAR OPTION IN ITALY AS LEAD INDUSTRIAL PARTNER.

NUCLEAR DIVISION

MAIN NUCLEAR PRODUCT LINES:

NEW REACTORS STUDIES:

- AP 600
- SBWR
- EPP
- ISIS

SERVICE AND CONSTRUCTION:

- CERNAVODA
- SPX
- VVER (Kozloduy,
Temelin, Kola,
Novoronez)

FABRICATION UCN:

- PCC, IC (SBWR)
- IHX (SPX)
- SPENT FUEL CASKS
(Germany)
- STEAM GENERATORS

NUCLEAR DIVISION

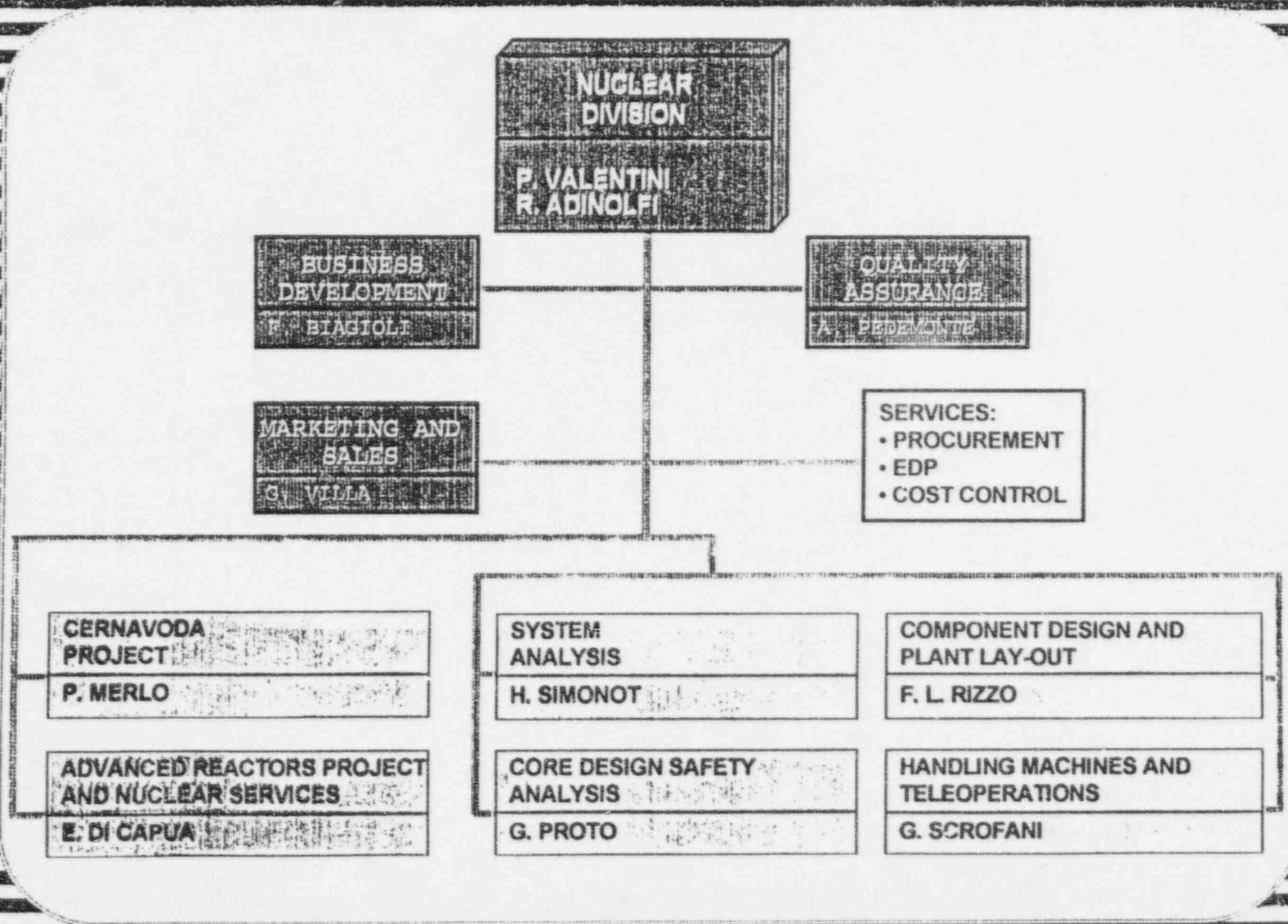
OTHER PRODUCT LINES

HI-TECH PRODUCTS:

- HANDLING MACHINES AND TELEOPERATION
- PLANT SIMULATORS
- EXPERT SYSTEMS FOR OPERATOR AID
- TEST LOOPS FOR NUCLEAR RESEARCH

SERVICES:

- PLANT LIFE EXTENSION
- RISK ASSESSMENT
- QUALITY MANAGEMENT



NUCLEAR DIVISION

ENGINEERING CAPABILITIES

- SYSTEM DESIGN
- SAFETY & RELIABILITY ANALYSIS
- MECHANICAL COMPONENTS DESIGN
- GENERAL PLANT ARRANGEMENT & PLANT LAY-OUT
- ELECTRICAL SYSTEMS
- INSTRUMENTATION & CONTROL
- SEISMIC & STRUCTURAL ANALYSIS
- THERMOHYDRAULICS
- RADIATION PROTECTION
- CORE DESIGN
- PLANT SIMULATION
- REMOTE HANDLING

ANSALDO ORGANIZATION

NUCLEAR DIVISION
ENOGAT

NUCLEAR COMPONENT UNIT
MILAN

● NUCLEAR MANAGEMENT COMMITTEE

● NUCLEAR COMMERCIAL COORDINATION

● COMPONENT DESIGN

● PROJECT MANAGEMENT

● QUALITY ASSURANCE

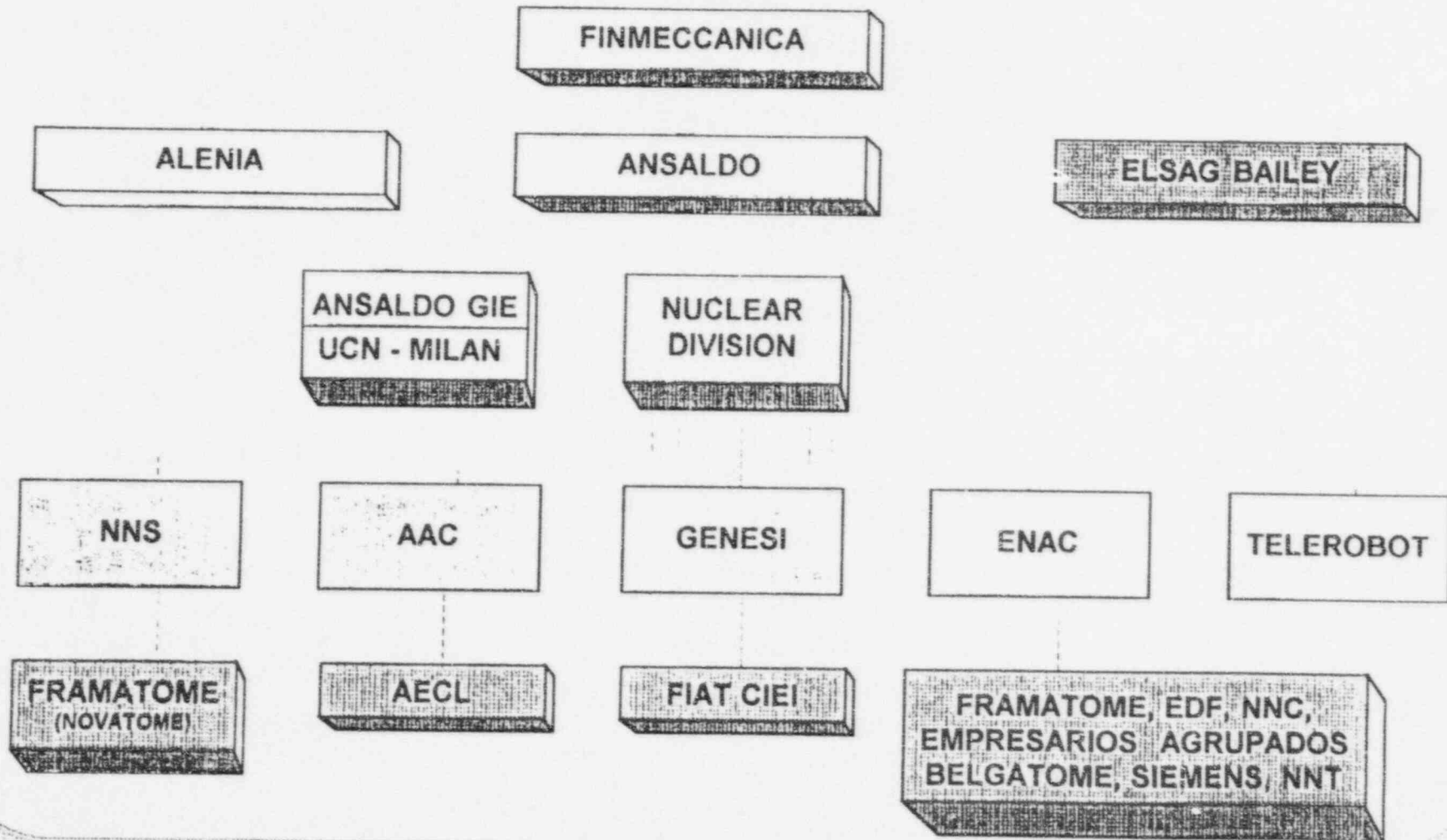
● SHOP ENGINEERING

● MANUFACTURING

● QUALITY CONTROL

● PROPOSAL

NUCLEAR DIVISION



NUCLEAR DIVISION

MAIN DATA FOR THE YEAR 1994

○ PERSONNEL

212

○ REVENUES

BILLION - LIRE

71

○ NEW ORDERS

BILLION - LIRE

68

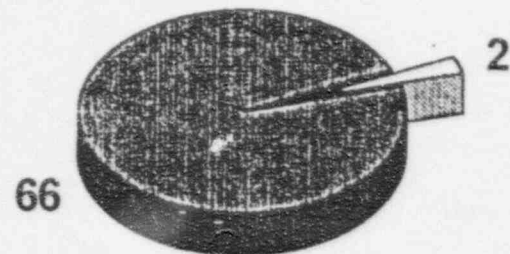
NUCLEAR DIVISION

- ITALY
- ABROAD

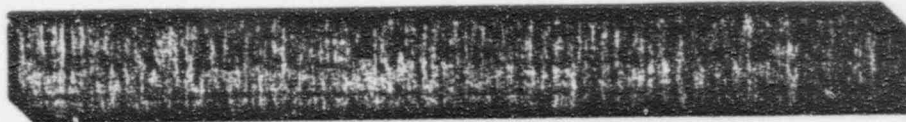
REVENUES



NEW ORDERS



NUCLEAR DIVISION



NEW REACTORS STUDIES:

- AP 600
- SBWR
- EPP
- ISIS

SERVICE AND CONSTRUCTION:

- CERNAVODA
- SPX
- VVER (Kozloduy, Temelin, Kola, Novovoronezh)

FABRICATION UCN:

- PCC, IC (SBWR)
- IHX (SPX)
- SPENT FUEL CASKS (Germany)
- STEAM GENERATORS

ANSALDO NUCLEAR DIVISION QUALITY SYSTEM

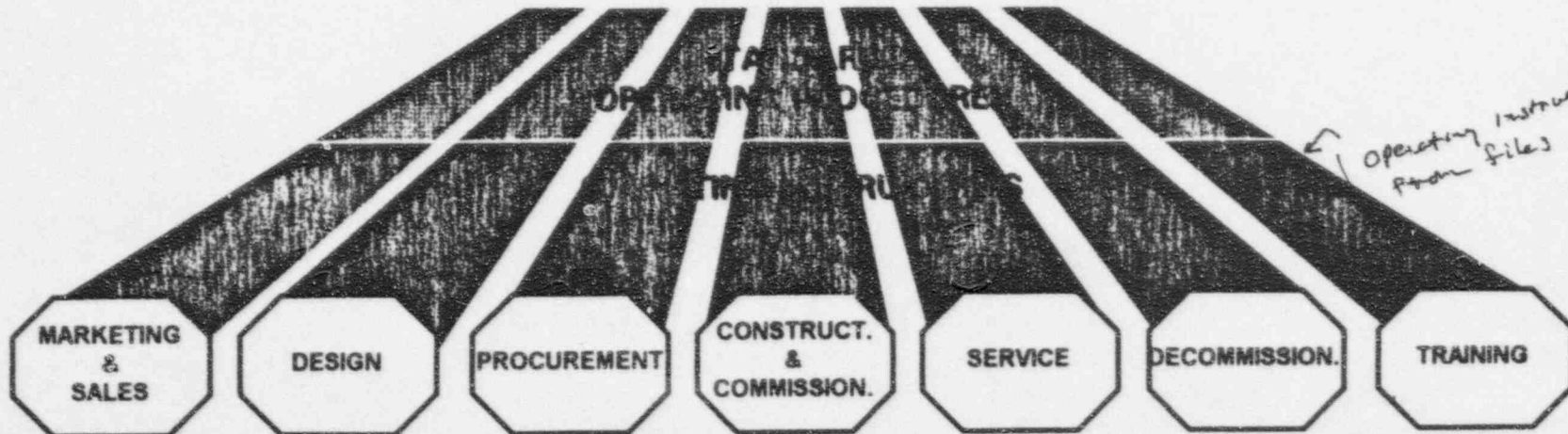
ISO 9001

IAEA
50-C-QA

ANSI/ASME
NQA-1

QA MANUAL

QUALITY PLANS OR QUALITY ASSURANCE PROGRAMS



ANSALDO

0. GENERALITY**0.1 TABLE OF CONTENTS****SECTION 0: GENERALITY****Rev. 4.**

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- 0.2. MANAGEMENT'S STATEMENT
- 0.3. TABLE OF COMPARISON BETWEEN QAM AND REGULATION EN29001

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 - 1.2. NUCLEAR DIVISION (DNU)
 - 1.2.1. BUSINESS DEVELOPMENT
 - 1.2.2. SERVICES
 - 1.2.2.1. PROCUREMENT
 - 1.2.2.2. EDP
 - 1.2.2.3. COST CONTROL
 - 1.2.3. MARKETING AND SALES
 - 1.2.4. QUALITY ASSURANCE
 - 1.2.5. NUCLEAR PROJECTS DEPARTMENTS
 - 1.2.6. ENGINEERING TECHNICAL DEPARTMENTS
 - 1.2.6.1. SYSTEM ANALYSIS
 - 1.2.6.2. CORE DESIGN AND SAFETY ANALYSIS
 - 1.2.6.3. COMPONENTS DESIGN AND PLANT LAY-OUT
 - 1.2.6.4. HANDLING MACHINES AND TELE-OPERATIONS
- ENCLOSURE N. 1

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- 2.2. QAP DESCRIPTIVE DOCUMENTS
- 2.3. MANAGEMENT OF THE QUALITY ASSURANCE MANUAL
- 2.4. APPLICATION SCOPE OF QAP
- 2.5. EXTENT AND DEGREE OF APPLICATION OF QAP
- 2.6. CRITERIA OF APPLICATION OF THE QAP

Q.A. MANUAL

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- 12.1. GENERALITY
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- 12.4. SURVEILLANCE BY DNU

SECTION 13: HANDLING, STORAGE AND SHIPMENT

Rev. 2.

- 13.1. GENERALITY
- 13.2. CONTROL OF THE ACTIVITIES
- 13.2.1. PROTECTION REQUIREMENTS
- 13.2.2. CONTROL AT THE SUPPLIERS' SHOPS
- 13.2.3. CONTROL ON THE SITE

SECTION 14: STATUS OF INSPECTIONS, TESTS AND OPERABILITY

Rev. 2.

- 14.1. GENERALITY
- 14.2. CRITERIA AND METHODS ADOPTED
- 14.3. DNU SURVEILLANCE

Q.A. MANUAL

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- 15.2. IDENTIFICATION OF THE NON-CONFORMING PLANT PARTS
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- 15.4. RESOLUTION OF THE NON-CONFORMANCE AND RELATED DOCUMENTS
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- 17.1. GENERALITY
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- 18.1. GENERALITY
- 18.2. PLANNING OF THE AUDITS
- 18.3. PREPARATION FOR THE AUDITS
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APPENDIX 1: PROCEDURES LIST Rev. 0

0.2. MANAGEMENT'S STATEMENT

The Nuclear Division Management of "ANSALDO un'Azienda Finmeccanica S.p.A." has defined a Quality Assurance Programme (Q.A.P.), as described in this present Manual, in order to assure the correct performance of the activities related to design, construction and start-up of structures, systems and components relevant with regard to Nuclear Safety and Radiation Protection, and their satisfactory operation.

The requirements of this Manual are also applicable, to the extent required by the project, for the activities related to the nuclear plants decommissioning and to the supply of non-nuclear plants or products pertaining to the Nuclear Division (DNU).

Ansaldo Nuclear Division Management has the responsibility for the application of the Q.A.P. The Q.A. Department Manager has the responsibility of verifying the efficiency, adequacy and correct implementation of the Q.A. Programme.

The management has also defined the tasks and responsibilities of the departments concerning the application of Q.A.P., the methods by which procedures shall be operated, and the degree of application of each single part of the Programme to be allocated to the various departments concerned.

In particular, the Quality Assurance Department is charged by the Management with the Q.A.P. definition; in particular the former reports directly to the Nuclear Division Management, thus assuring the required independence.

It is therefore intended that Q.A. personnel has the responsibility and the authority to identify problems and suggest and follow-up solutions defined within the organizational framework concerned.

The Nuclear Division Management also sets the information instruments regarding the qualitative trend of the activities; particularly, the Quality Assurance Department must inform the Management sistematically about the observance and efficiency of the QA program.

The Nuclear Division Manager



Q.A. MANUAL

A-M-DNU-001

MANUALE DI G.Q.

0.3 **TABLE OF COMPARISON BETWEEN QAM AND REGULATION EN29001**

Subjects Title	Chapter EN 29001	QAM Corresponding chapter
Management's Responsibilities	4.1	0.2. - 1.
Quality System	4.2	2.
Contract review	4.3	2.6.1
Verification of the design	4.4	3.
Verification of the documentation	4.5	6.
Procurement	4.6	4. - 7.
Products supplied by the customer	4.7	7.7
Identification and traceability of the products	4.8	8.
Verification of the production process	4.9	9.
Tests and inspections	4.10	10. - 11.
Testing and measurement equipment	4.11.	12.
Status of inspections and tests	4.12	14.
Non-conforming products inspection	4.13	15.
Corrective actions	4.14	16.
Handling, packing, storage and delivery	4.15	13.
Quality Assurance records	4.16	17.
Quality Assurance internal audits	4.17	18.
Training	4.18	2.8.
Assistance	4.19	(1)
Statistics	4.20	(2)

- (1) DNU performs assistance and service activities within the contractual limits and in accordance with the established procedures complying with this QAM.
- (2) When necessary, the suitable techniques are detected and regulated by proper procedures, if needed.

ANSALDO

Un'Azienda Finmeccanica

PROGRAMMA GLOBALE VERIFICHE ISPETTIVE INTERNE**ANNO 1995**

DIVISIONE NUCLEARE

ENTE	PROGETTO CONTRATTO	RGVI	Ente di supporto	GEN.		FEB.		MAR.		APR.		MAG.		GIU.		LUG.		AGO.		SET.		OTT.		NOV.		DIC.		NOTE
				I	II	I	II	I	II	I	II	I	II	I	II	I	II	I	II	I	II	I	II	I	II	I	II	
ANH	VARI	Arena							☐																		Audit di sistema	
CER	CER 1	Arena										☐																
CNU	VARI	Marsano																			☐						Audit di sistema	
IMP	CER 1	Arena											☐															
IMP	FOAKE	Marsano						☐																				
IMP	Kozloduy	Marsano			▲																							
IMP	SPX 1	Arena								☐																		
MTL	SPX 1	Sala B.							☐																			
MTL	VARI	Arena									☐																Audit di sistema	
NEA	FOAKE	Marsano										☐																
NEA	SA1	Sala B.												☐														
NRS	FOAKE	Marsano					☐																					
NRS	SPX 1	Sala B.						☐																				
SIS	CER 1	Arena								☐																		
SIS	FOAKE	Marsano								☐																		
SIS	Kozloduy	Marsano			▲																							
SIS	SPX 1	Sala B.															☐											
STR	FOAKE	Marsano											☐															



V.I. NON PROGRAMMATA

V.I. EFFETTUATA
RAC EMESSA/EV.I. EFFETTUATA
RISP.A RAC ACCET.

V.I. PROGRAMMATA

RICH. AZIONE
DI FOLLOW-UPV.I. COMPLETATA
CLOSE-UP
 REDAZIONE
Marsano
 MARSANO
 DATA 18/1/95

 APPROVAZIONE
Pelemonte
 PEDEMONTÉ
 DATA 3/2/95

ANSALDO

Un'Azienda Finmeccanica

DIVISIONE NUCLEARE

PROGRAMMA GLOBALE VERIFICHE ISPETTIVE INTERNE**ANNO 1995**

ENTE	PROGETTO CONTRATTO	RGVI	Ente di supporto	GEN.		FEB.		MAR.		APR.		MAG.		GIU.		LUG.		AGO.		SET.		OTT.		NOV.		DIC.		NOTE
				I	II	I	II	I	II	I	II	I	II	I	II	I	II	I	II	I	II	I	II	I	II			
ANH	VARI	Arena							▲																			
CER	CER 1	Arena							▲				▲															Audit di sistema
CNU	VARI	Marsano											▲															
IMP	CER 1	Arena											⊗									■						Audit di sistema
IMP	FOAKE	Marsano							⊗			■					■											
IMP	Kozloduy	Marsano				⊗					■	■																
IMP	SPX 1	Arena									⊗																	
MTL	SPX 1	Sala B.									⊗																	
MTL	VARI	Arena							▲																	■		
NEA	FOAKE	Marsano											▲				■											Audit di sistema
NEA	SA1	Sala B.																	■									
NRS	FOAKE	Marsano					■																					
NRS	SPX 1	Sala B.						⊗			■																	
SIS	CER 1	Arena									⊗																	
SIS	FOAKE	Marsano										■																
SIS	Kozloduy	Marsano					▲																					
SIS	SPX 1	Sala B.																										
STR	FOAKE	Marsano																⊗										

<input type="checkbox"/> V.I. NON PROGRAMMATTA	<input checked="" type="checkbox"/> V.I. EFFETTUATA RAC EMESSAE	<input checked="" type="checkbox"/> V.I. EFFETTUATA RISP.A RAC ACCET.	<input checked="" type="checkbox"/> V.I. PROGRAMMATTA	<input checked="" type="checkbox"/> RICH. AZIONE DI FOLLOW-UP	<input checked="" type="checkbox"/> V.I. COMPLETATA CLOSE-UP	REDAZIONE MARSANO DATA 18/1/95	APPROVAZIONE PEDEMONTE DATA 3/2/95
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AUDITS MADE BY :

GENERAL ELECTRIC :

I[^] 15/10/1990 No CAR Issued

II[^] 27/09/1993 No CAR Issued

WESTINGHOUSE :

I[^] 15-16/07/1991 Issued n. 1 N.C. and n. 5 OBS

II[^] 25-26/02/1993 Issued n. 3 N.C. and n. 2 OBS

III[^] 24-26/10/1995 No findings

RAG. SOCIALE	LOCALITA	NAZ	SIS.QUA	MERC. DESCRIZIONE	ESITO ISP.QUA. Q G - DETTAGLIO	VERBALE	D.VISITA	D.SCAD.	MANUALE QUALITA / RE
ABB ADDA S.P.A.	LODI	- I	ISO-9001	MC -COMPONENTISTICA DA QUADRO	C R -				
ABB ELETTROCONDUTTURE S.P.A.	MILANO	- I	ISO-9001	NAC -Interruttori AT (SF6 - ar	C R -				
ABB INDUSTRIA S.p.A. Filiale di GENOVA	GENOVA	- I	ISO-9001	PIA -Sistemi integrati di auto	C R -				
ABB INDUSTRIA SPA	SESTO S.GIOVANNI	- I	ISO-9001	LF -ALTRI COMPONENTI ELETTRIC	C R -				
ABB KENT-TAYLOR S.P.A.	LENNO	- I	ISO-9001	MD -STRUMENTAZIONE LOCALE E A	C R -				
				IG -VALVOLE DI REGOLAZIONE	C R -				
				MAE -Quadri regolazione	C R -				
				MAK -Banchi, cofani e cassette	C R -				
				MB -STRUMENTAZIONE DA QUADRO	C R -				
				MD -STRUMENTAZIONE LOCALE E A	-				
				MDF -Trasmettitori di pression	-				
				MDG -Trasmettitori di posizion	-				
				MDM -Trasmettitori di livello	-				
				MDL -Regolatori locali	-				
				MEA -Strumenti per analisi	-				
				PI - SISTEMI DI AUTOMAZIONE E	-				
				PIB -Sistemi di regolazione e	-				
ADVEL ELETTRONICA INDUS.LE SRL	SEGRATE	- I	ISO-9002	N -APPARECCHIATURE ELETTRICH	C R -				
AGFA GEVAERT SPA	MILANO	- I	ISO-9002	DOF -Macchine ed attrezzature	-				
ALCATEL CAVI SPA	COLOGNO MONZESE	- I	ISO-9002	LAI -Cavi per telecomunicazion	C R -				
ALCATEL DIAL FACE SPA	MILANO	- I	ISO-9001	LAK -Cavi speciali (navali, po	C R -				
				7B -MOLEGGIO MACCHINE DA UFFI	-				
				LDI -Telefax	C R -				
ALGA SPA	MILANO	- I	ISO-9002	ICA -Supporti elastici a caric	C R -				
ANSALDO AZ.FINM.DIV.DNU	GENOVA	- I	ISO-9001	1F -PROGETTAZIONI SISTEMISTIC	1 Q -	PQA-95-383	02/11/95		A-M-DNU-001
ANSALDO COMPONENTI S.R.L.	MILANO	- I	ISO-9001	2F -ATTIVITA' DI SUPERVISIONE	1 Q -				A-M-DNU-001
ANSALDO ENERGIA SPA	GENOVA (CORNIGLI	- I	ISO-9001	G -CALDARERIA	1 Q -				COPIA CONTROLLA.103
				H -APPARECCHIATURE DI SCAMBI	1 Q -				
				OAA -Generatori in c.a. (esclu	C Q -				
				OAB -Generatori in c.c.	C Q -				
				QBA -Turbograppi a vapore	C Q -				
				QBB -Turbograppi a gas	C Q -				
ANSALDO INDUSTRIA SPA	GORIZIA	- I	ISO-9001	LF -ALTRI COMPONENTI ELETTRIC	C R -				SEZIONI "A" E "C"
				NAC -Interruttori AT (SF6 - ar	-				
AUSONIA SRL	MARSALA	- I	ISO-9002	OAA -Generatori in c.a. (esclu	C R -				
BELLELI S.P.A.	MANTOVA	- I	ISO-9001	1B -PROGETTAZIONI MECCANICHE	1 Q - 2Q-3Q-4Q	RVA 04/91	18/12/91	17/12/94	PSQ 01 E GAR 05
				3B -MONTAGGI MECCANICI	-				
				3BA -Montaggi di caldaie ed au	-				
				AC -TUBI IN CANNE DIRITTE	-				
				F -STRUTTURE METALLICHE E CO	-				
				G -CALDARERIA	-				
				GD -SERBATOI A PRESSIONE ATMO	-				
				GE -SERBATOI ED INVOLUCRI IN	-				
				H -APPARECCHIATURE DI SCAMBI	-				
				HC -PRERISCALDATORI ACQUA ALI	-				
				HH -SCAMBIATORI A PIASTRE E R	-				
				HK -BATTERIE DI SCAMBIO TERMI	-				
				PO -IMPIANTI E SISTEMI PER CE	-				
				POF -Generatori di vapore nucl	-				

SOCIALE	LOCALITA	NAZ	SIS.QUA	MERC. DESCRIZIONE	ESITO ISP.QUA.		VERBALE	D.VISITA	D.SCAD.	MANUALE QUALITA / REV.
					Q	G - DETTAGLIO				
REDI SPA	SE-SAMPIERDARENA	I	ISO-9002	EA -MACCHINE UTENSILI	-	-				/
				EF -ATTREZZI	-	-				/
				IM -GUARNIZIONI, ANELLI DI TE	-	-				/
ROCCHI SRL	BIASSONO	I	ISO-9001	N -APPARECCHIATURE DI SCAMBI	C	R				/
				HAZ -Condensatori di altro tip	-	-				/
				HB -TORRI EVAPORATIVE	-	-				/
				HF -SCAMBIATORI A FASCIO TUBI	-	-				/
				HFA -Scambiatori a fascio tubi	-	-				/
				HI -AEROTERMI	-	-				/
				JG -VENTILATORI E SOFFIANTI (-	-				/
				JGB -Altri ventilatori centrif	-	-				/
				JGD -Altri ventilatori assiali	-	-				/
				JGE -Soffianti	-	-				/
				JGP -Terrini di estrazione	-	-				/
				PBF -Imp. di depolverazione	-	-				/
				PCA -Imp. ventilazione e condi	-	-				/
SRL	MELE	I	ISO-9002	SK -LAVORAZIONI ELETTRICHE ED	-	-				/
				MA -QUADRI STRUMENTAZIONE E C	-	-				/
				MRE -Quadri TV, quadri contro	-	-				/
				MCB -Quadri power center	-	-				/
				MCC -Quadri meter control cent	-	-				/
				MCD -Quadri sottedistribuzione	-	-				/
				MDQ -Schede	-	-				/
				PI - SISTEMI DI AUTOMAZIONE E	-	-				/
Calderaria-Carpenteria-Meccanica s.r.l.	Amelia	I	ISO-9003	P -STRUTTURE METALLICHE E CO	C	R	ZDI/042	16/03/94	16/03/96	/
				G -CALDERERIA	C	R				/
				P -IMPIANTI E SISTEMI PACKAG	C	R				/
S.P.A.	SAN MARTINO DI B	I	ISO-9002	MD -STRUMENTAZIONE LOCALE E A	C	R				/
				MDC -Pressostati	C	R				/
				MDD -Termostati	R	-				/
				MDZ -Altri strumenti (dinamo t	-	R				/
SA	COUR-CHEVERRY	F	ISO-9002	I -COMPONENTI MECCANICI	4	Q	RVA003/93	16/09/93	15/09/94	/
A. BOCSA	BOCSA	R	ISO-9002	F -STRUTTURE METALLICHE E CO	2	R	RVA 005/95	29/11/95	28/11/98	MC-BAC-02 / 0
				FA -CARPENTERIE E STRUTTURE P	2	R	RVA005/95	29/11/95	28/11/98	MC-BAC-02 / 0
				FAA -Carpenterie e strettore p	2	R	RVA 005/95	29/11/95	28/11/98	MC-BAC-02 / 0
				FAB -Carpenterie e strettore p	2	R	RVA 005/95	29/11/95	28/11/98	MC-BAC-02 / 0
				FAP -Casse a spirale per torbi	2	R	RVA 005/95	29/11/95	28/11/98	MC-BAC-02 / 0
				FB -CARPENTERIE E STRUTTURE M	2	R	RVA 005/95	29/11/95	28/11/98	MC-BAC-02 / 0
				FC -CARPENTERIE E STRUTTURE L	2	R	RVA 005/95	29/11/95	28/11/98	MC-BAC-02 / 0
				FCB -Scale, passerelle e ringh	2	R	RVA 005/95	29/11/95	28/11/98	MC-BAC-02 / 0
				FCC -Grigliati	2	R	RVA 005/95	29/11/95	28/11/98	MC-BAC-02 / 0
				FCP -Piastra e maschere di fen	2	R	RVA 005/95	29/11/95	28/11/98	MC-BAC-02 / 0
				FCG -Camini metallici	2	R	RVA 005/95	29/11/95	28/11/98	MC-BAC-02 / 0
				FEA -Candelle aria e femi	2	R	RVA 005/95	29/11/95	28/11/98	MC-BAC-02 / 0
				J1 - APPARECCHIATURE PER IMP	2	R	RVA 005/95	29/11/95	28/11/98	MC-BAC-02 / 0
INDIVIDUALE QUADRACCIA MARIO	TERNI	I	ISO-9001	3B -MONTAGGI MECCANICI	C	R				/
				S -LAVORAZIONI E TRATTAMENTI	-	-				/
				MCD -Quadri sottedistribuzione	-	-				/
BAILEY UN'AZIENDA FIRMECCANICA SPA	GENOVA	I	ISO-9001	D -MATERIALI E PRODOTTI DIVE	-	-				/

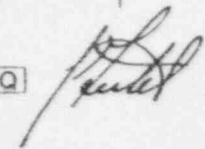
ANSALDO
GIE

Stabilimento MILANO

ELENCO FORNITORI QUALIFICATI PER SCAMBIATORI PCCS & ICS
QUALIFIED VENDOR LIST FOR "PCCS & ICS" HEAT EXCHANGERS (SBWR)

E F Q

No. ITEM	FORNITORE	CAT.	LOCALITA'	QUALIFICA ASME (O EN 29002) ASME O EN 29002 QUALIFICATION		QUALIFICA ANSALDO GIE/MI ANSALDO GIE QUALIFICATION			SCOPI E LIMITI DELLA QUALIFICA
				No CERT. CERT. No	SCADENZA EXPIRAT.	No EAR EAR No	EMES. IL ISS'D ON	SCADENZA EXPIRAT.	
ITEM No.	VENDOR	CAT.	LOCATION	No CERT. CERT. No	SCADENZA EXPIRAT.	No EAR EAR No	EMES. IL ISS'D ON	SCADENZA EXPIRAT.	SCOPE & LIMITS OF THE QUALIFICATION
1	DALMINE TUBI INDUSTR. S.r.l.	MM	BERGAMO (ITALY)	EN 29002	20.02.97				STEEL SEAMLESS TUBES (Manual according ASME NCA 300)
	E.T.C. ELETTROTHERMOCHIMICA	MM	PADOVA (ITALY)	EN 29002 (LRQA)	06.07.97				ARC WELDING ELECTRODES.
3	FOMAS	MM	OSNAGO (CO) (ITALY)	QSC-273 EN 29002 (DNV)	06.07.97 15.03.95				FERROUS & NONFERROUS FORGINGS & SEAMLESS TUBULAR PRODUCTS
4	FORGIATURA MORANDINI	MM	CIVITATE CAMUNO (BS) (ITALY)	EN 29002 (RINA)	06.11.95				CARBON, LOW AND HIGH ALLOY STEEL FORGINGS AND STAIN- LESS STEEL FORGINGS.
5	FORGITAL SPEZZAPRIA	MM	SEGHE DI VELO (VI) (ITALY)	EN 29002	MAY. 97	EAR 291	26.02.93	26.02.94	FORGED ITEMS, ROLLED RINGS IN CARBON AND STAINLESS STEELS, ALLOY & SUPERALLOY
6	NUOVA TERMICS	MS	CREMONA (ITALY)	==	==	SCH.TEC. N. 02	21.07.93	21.07.94	INSTALLATION ELECTRICAL INSTRUMENTATION (PENDENTE QUALIFICA DA PARTE I.M.Q.)



ANSALDO

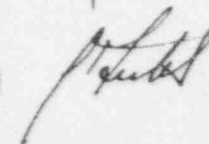
GIE

Stabilimento MILANO

ELENCO FORNITORI QUALIFICATI PER SCAMBIATORI PCCS & ICS
 QUALIFIED VENDOR LIST FOR "PCCS & ICS" HEAT EXCHANGERS (SBWR)

E F Q

No. ITEM	FORNITORE	CAT.	LOCALITA'	QUALIFICA ASME (O EN 29002) ASME O EN 29002 QUALIFICATION		QUALIFICA ANSALDO GIE/MI ANSALDO GIE QUALIFICATION			SCOPI E LIMITI DELLA QUALIFICA
ITEM No.	VENDOR	CAT.	LOCATION	No CERT. CERT. No	SCADENZA EXPIRAT.	No EAR EAR No	EMES. IL ISS'D ON	SCADENZA EXPIRAT.	SCOPE & LIMITS OF THE QUALIFICATION
7	O. C. S.	M	ALBIGNASEGO (PD) (ITALY)	S, U1	01.06.95	EAR 294 SCH.TEC. N. 01	22.06.93 22.06.93	22.06.94 ==	EXCHANGE TUBES BENDING
8	O.M.E. METALLURGICA ERBESE S.p.A.	MM	ERBA (COMO) (ITALY)	EN 29002 (D.N.V.)	11.11.95				MANUFACTURER OF BOLTING FOR NUCLEAR FIELDS. (Manual according ASME NCA 3P)
9	T.A.D. COMMERCIALE	MS	LAINATE (MI) (ITALY)	EN 29002 (D.N.V.)	15.12.96	EAR 290	27.11.92	27.11.93	STOCKHOLDING OF: PIPES, FITTINGS (WELDED AND SEAMLESS) HOLLOW BARS AND BARS OF STAINLESS STEEL.
10	STERLING TUBES Ltd. (Subsidiary of T.A.D.) Suffolk	MM	CHESTERFIELD (ENGLAND)	EN 29002 (LL.RR.)	31.05.96				ALLOY AND STAINLESS STEEL AND HOT AND COLD FINISHED SEAMLESS STAINLESS STEEL TUBING.
11	TOFREN MACCHINE	MS	SOLTO COLLINA (BG) (ITALY)	EN 29002 (LL.RR.)	30.06.96	EAR 292 EAR 293 EAR 295	15.03.93 03.09.93 11.10.93	15.03.94 03.09.94 11.10.94	FABRICATION OF INDUSTRIAL STEEL STRUCTURES TO CLIENT SPECIFICATIONS.



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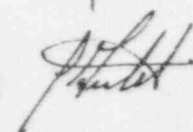
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Stabilimento MILANO

ELENCO FORNITORI QUALIFICATI PER SCAMBIATORI PCCS & ICS
 QUALIFIED VENDOR LIST FOR "PCCS & ICS" HEAT EXCHANGERS (SBWR)

E F Q

No. ITEM	FORNITORE	CAT.	LOCALITA'	QUALIFICA ASME (O EN 29002) ASME O EN 29002 QUALIFICATION		QUALIFICA ANSALDO GIE/MI ANSALDO GIE QUALIFICATION			SCOPI E LIMITI DELLA QUALIFICA
				No CERT. CERT. No	SCADENZA EXPIRAT.	No EAR EAR No	EMES. IL ISS'D ON	SCADENZA EXPIRAT.	
ITEM No.	VENDOR	CAT.	LOCATION	No CERT. CERT. No	SCADENZA EXPIRAT.	No EAR EAR No	EMES. IL ISS'D ON	SCADENZA EXPIRAT.	SCOPE & LIMITS OF THE QUALIFICATION
12	VALINOX. (NUCLEAR DIVISION)	MM MS	MONTBARD (FRANCE)	QSC-421 QSC-563	21.11.95 08.02.96				FERROUS & NONFERROUS BARS, SEAMLESS TUBULAR PRODUCTS AND STRUCTURAL SHAPES.
13	KRUPP - VDM GmbH (MANNESMANN GROUP)	MS MM	LANGENFELD (GERMANY)	QSC-553	31.08.96				MATERIAL MANUFACTURER OF FERROUS & NONFERROUS FIT- TING WELDED WITH AND WHITOUTH FILLER METAL; SEAMLESS TUBULAR PRODUCTS.
14	I.M.L. (INDUSTRIA MECC. LIGURE)	MM	RECCO (GENOVA)	EN 29002 (RINA)	OTT. 94				FITTINGS, BOLTS AND NUTS IN UNALLOYED, LOWALLOYED AND AUSTENITIC STEELQUALITIES. (FOR SBWR JOB / VN 0015)
15	F.B.M. - HUDSON	MM	TERNO D'ISOLA (BERGAMO)	S - U U2-PP EN 29001 (D.N.V.)	MAG. 97 SET 95				EXCHANGE TUBES (INCONEL) BENDING.

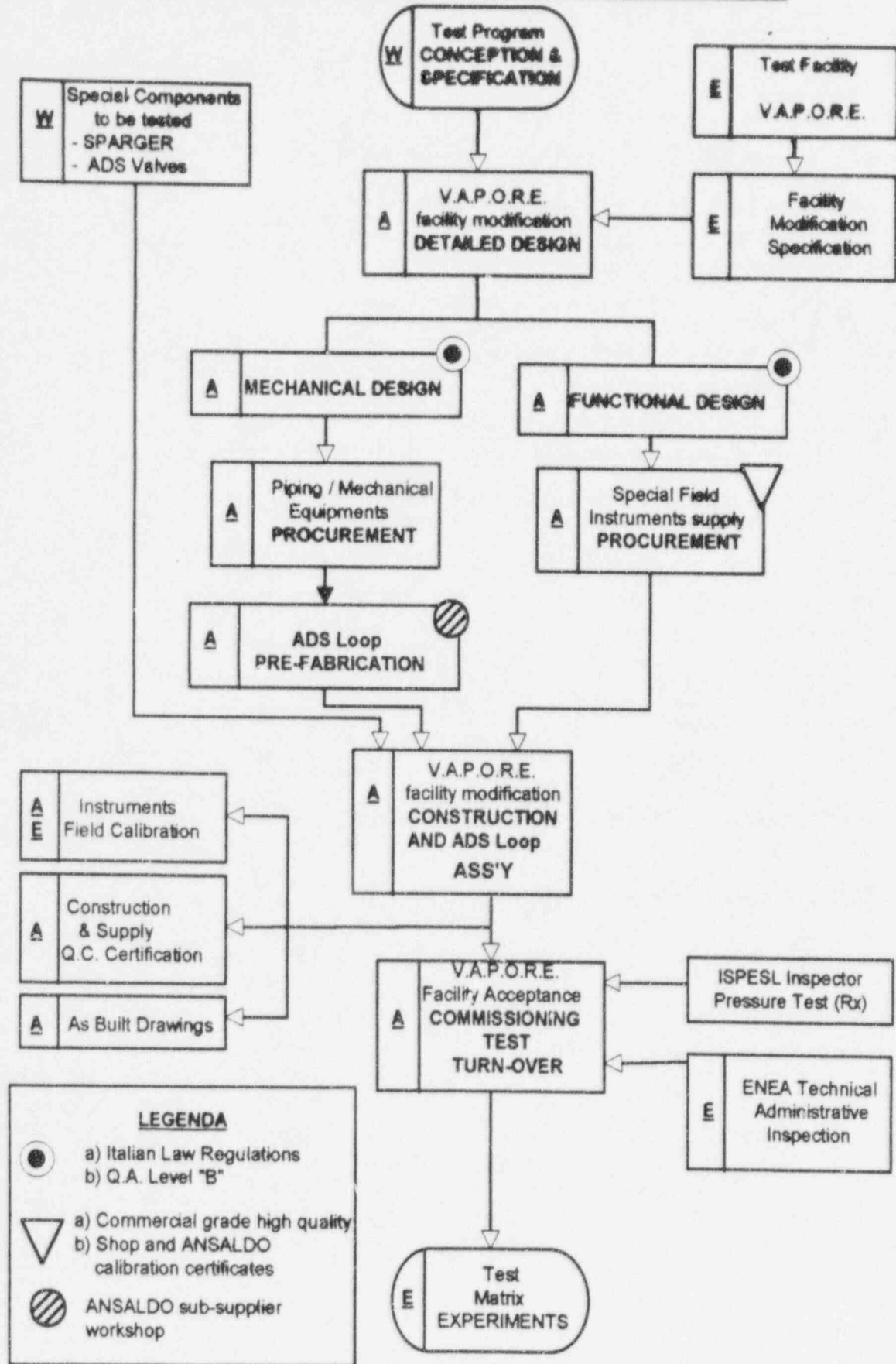


**V.A.P.O.R.E. Facility
modifications**

ACTIVITY ----- CONTRACT	CONTRACT QUALITY REQUIREMENT	ACTUAL QUALITY SYSTEM
Phase "A" ENEA ---> Ansaldo	Best Engineering Practice	Ansaldo Q.A. Program Level "B" (*) Technical Documentation
Phase "B-1" ENEA ---> Ansaldo	Best Engineering Practice (fulfills the requirements of Westinghouse Specification)	Ansaldo Q.A. Program Level "B" (*) Technical Documentation
Phase "B-2" Westinghouse ---> Ansaldo	Westinghouse Specification Ref.: Contract Letter MB-21177-S	Ansaldo Q.A. Program Level "B" (*) Technical Documentation

(*) According to DNU Quality Assurance Manual

ADS TEST PROGRAM AT V.A.P.O.R.E. FACILITY (ENEA-CASACCIA)



Progetto project SBWR		Identificativo document no. SBW5280IQQXQ001000			
Cliente client ENEL		Comm. job. no. N27000	Emittente issued by DNU/DIR	Pagina page 1	Di of 37
Rag. disc. disc. code	Rif. str. prod. prod. str. no.	Identificativo componente equipment identification code PCC & IC		Tipo doc. doc. type PGQ	Allegati enclosures
Titolo PIANO DELLA QUALITA' per la realizzazione delle unità prototipo di Isolation Condenser (IC) e Passive Containment Cooling Condenser (PCC) dell'Associazione Temporanea di Impresa tra Consorzi GENESI e ANSALDO GIE <i>Quality Assurance Plan for the realization of the Isolation Condenser (IC) and Passive Containment Cooling Condenser (PCC) prototype units of the temporary Enterprise Association between the GENESI Consortium and ANSALDO GIE</i>				Derivato da derived from	Sostituisce substitutes

Rev. 0 Data 20.04.1993 Descrizione: Stato valid.:
rev. date description rev. scope

Redazione
prepared by

A. ZANARDI
A. Zanardi

Controllo / Approvazione
checked by / approved by

A. PEDEMONTE
A. Pedemonte

Autorizzazione emissione:
issue authorization

R. ADINOLFI
R. Adinolfi

Il presente documento è redatto in lingua Italiana ed in lingua Inglese; la versione inglese comincia a pag. 21.
This document is written both in English and Italian languages; the English translation beginning is at pag. 21.

NAC-GTD 1505 1496							
	1	15.07.1993	Rev. seguito riunione ENEL 6/7-5-93 + rapp. NRS/NRG103 revised following meeting 6/7-5-93 + report NRS/NRG 103		<i>A. Zanardi</i> ZANARDI	<i>A. Pedemonte</i> PEDEMONTE	<i>R. Adinolfi</i> ADINOLFI
Rev. rev.	Date date	Descrizione description		Stato valid rev. scope	Redazione prepared by	Controllo/ approvazione checked by/ approved by	Autorizzazione emissione ISSUE authorization

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Progetto Project	Identificativo Document no.	Rev. Rev.	Pagina Page
SBWR	SBW5280IQQX0001000	1	21

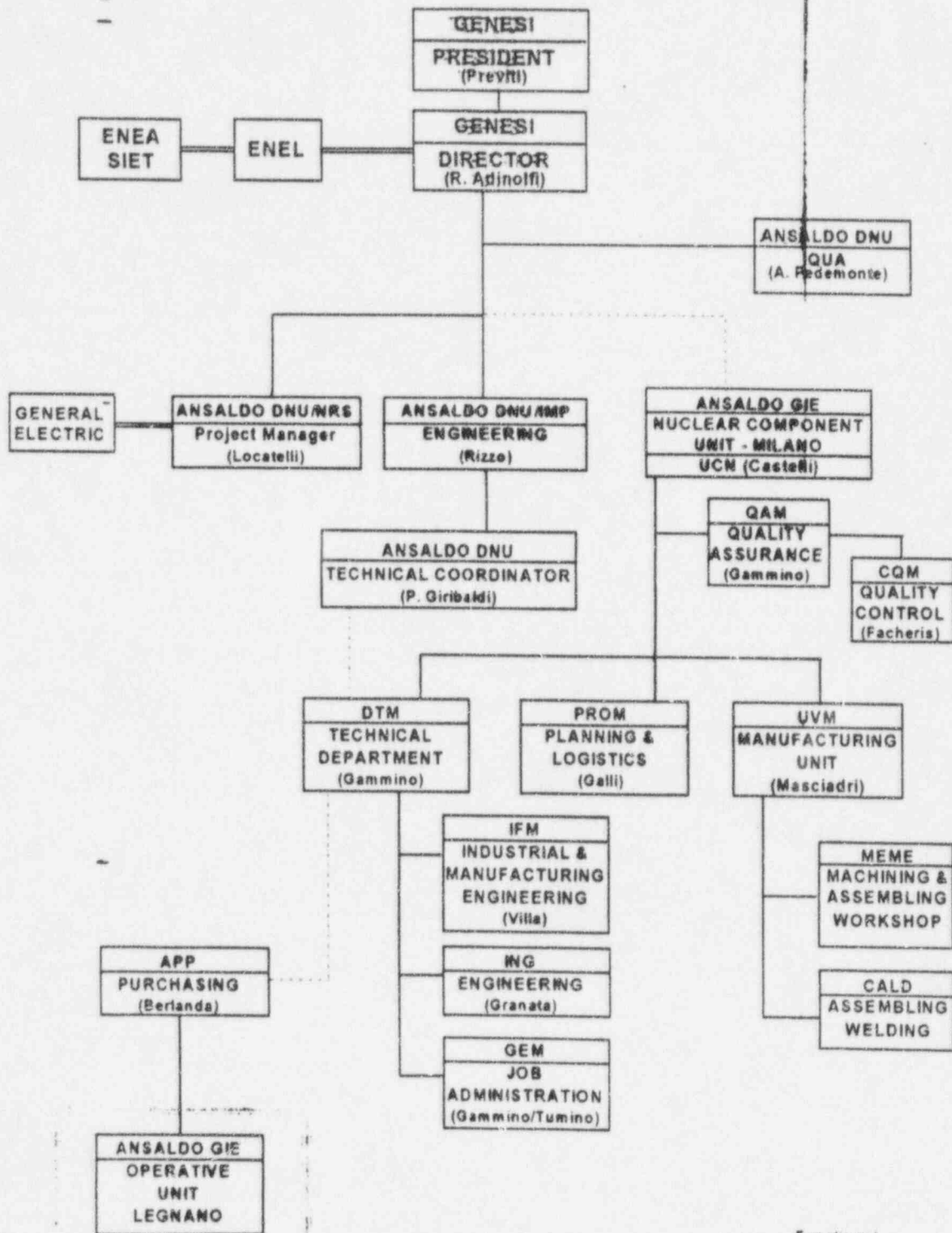
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 2. ORGANIZATION
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 4. CONSTRUCTION DESIGN
 5. PURCHASE DOCUMENTS REVIEW
 6. INSPECTION OF THE PURCHASED PLANT PARTS AND SERVICES
 7. COMPONENTS IDENTIFICATION AND CONTROL
 8. CONTROL OF THE SPECIAL PROCESSES
 9. INSPECTIONS, TESTS CONTROL
 10. MEASUREMENT AND TEST EQUIPMENTS CONTROL
 11. HANDLING, STORAGE, PRESERVATION, MARKING AND SHIPMENT
 12. CONTROL OF NON-CONFORMANCES AND MODIFICATIONS (DEROGATIONS)
 13. ANSALDO DNU SUPERVISION OF CONSTRUCTION
 14. AUDITS
 15. CORRECTIVE ACTIONS
 16. QUALITY ASSURANCE RECORDS
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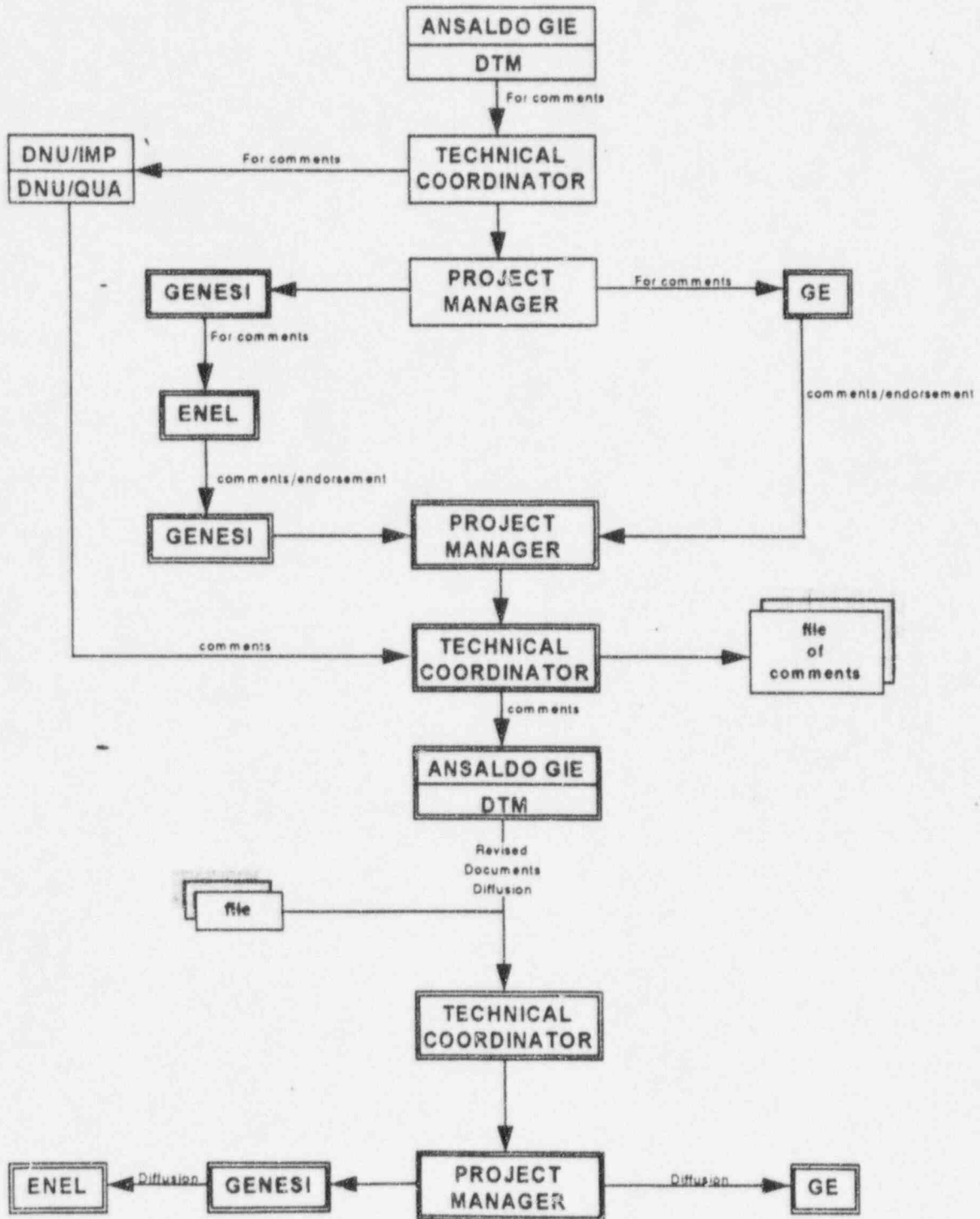
Progetto Project	Identificativo Document no.	Rev. Rev.	Pagina Page
SBWR	SBW5280IQXQ001000	1	26



ORGANIZATION DIAGRAM OF THE TEMPORARY ENTERPRISE ASSOCIATION GENESI - ANSALDO GIE

..... Functional
 ————— Hierarchical
 = = = = = Contractual

FLOW CHART OF DOCUMENTS ISSUED BY ANSALDO GIE



CERTIFICATE OF AUTHORIZATION

This certificate accredits the named company as authorized to use the indicated symbol of the American Society of Mechanical Engineers (ASME) for the scope of activity shown below in accordance with the applicable rules of the ASME Boiler and Pressure Vessel Code. The use of the code symbol and the authority granted by this Certificate of Authorization are subject to the provisions of the agreement set forth in the application. Any construction stamped with this symbol shall have been built strictly in accordance with the provisions of the ASME Boiler and Pressure Vessel Code.

COMPANY

ANSALDO ENERGIA SPA
STABILIMENTO DI MILANO
VIALE SARCA, 336
20126 MILANO, ITALY

SCOPE

CLASS 1, 2 & 3 VESSELS & PIPING SYSTEMS; CLASS 2 & 3 STORAGE TANKS;
CLASS CS CORE SUPPORT STRUCTURES AND CLASS 1 CONTROL ROD DRIVE HOUSINGS
AT THE ABOVE LOCATION ONLY

AUTHORIZED

APRIL 14, 1995 REVISED: AUGUST 17, 1995

EXPIRES

MARCH 5, 1998

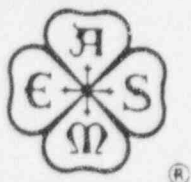
CERTIFICATE NUMBER

N-2858

SYMBOL

N

The American Society of Mechanical Engineers



Domènec A. Canaves
CHAIRMAN OF THE BOILER
AND PRESSURE VESSEL COMMITTEE

Alan Baum
DIRECTOR, ACCREDITATION AND CERTIFICATION

CERTIFICATE OF AUTHORIZATION

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COMPANY

ANSALDO ENERGIA SPA
STABILIMENTO DI MILANO
VIALE SARCA, 336
20126 MILANO, ITALY

SCOPE

CLASS 1, 2, 3 & CS SHOP ASSEMBLY OF STAMPED COMPONENTS, PARTS, APPURTENANCES, PIPING SUBASSEMBLIES & COMPONENT SUPPORTS AT THE ABOVE LOCATION ONLY

AUTHORIZED	APRIL 14, 1995	REVISED: AUGUST 17, 1995
EXPIRES	MARCH 5, 1998	
CERTIFICATE NUMBER	N-2859	
SYMBOL	NA	

The American Society of Mechanical Engineers



Domènec A. Canaves
CHAIRMAN OF THE BOILER
AND PRESSURE VESSEL COMMITTEE

Alan Bayne
DIRECTOR, ACCREDITATION AND CERTIFICATION

CERTIFICATE OF AUTHORIZATION

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COMPANY

ANSALDO ENERGIA SPA
STABILIMENTO DI MILANO
VIALE SARCA, 336
20126 MILANO, ITALY

SCOPE

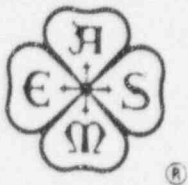
CLASS 1, 2, 3 & MC VESSEL PARTS & APPURTENANCES; CLASS 1, 2 & 3 PUMP PARTS & APPURTENANCES, COMPONENT SUPPORTS FABRICATION & COMPONENT SUPPORTS PARTS & PIPING SUBASSEMBLIES; CLASS 2 & 3 STORAGE TANK PARTS & APPURTENANCES; CLASS CS CORE SUPPORT STRUCTURE PARTS & APPURTENANCES AND CLASS 1 CONTROL ROD DRIVE HOUSINGS AT THE ABOVE LOCATION ONLY

AUTHORIZED	APRIL 14, 1995	REVISED: AUGUST 17, 1995
EXPIRES	MARCH 5, 1998	
CERTIFICATE NUMBER	N-2860	
SYMBOL	NPT	

Domènec A. Canaves
CHAIRMAN OF THE BOILER
AND PRESSURE VESSEL COMMITTEE

Alan Baum
DIRECTOR, ACCREDITATION AND CERTIFICATION

The American Society of Mechanical Engineers



®

CERTIFICATE OF ACCREDITATION

This certificate accredits the named company as having had the adequacy of their quality assurance program verified for the scope of activity shown below in accordance with the applicable rules of the Boiler and Pressure Vessel Code of the American Society of Mechanical Engineers (ASME). This certificate does not include authorization to use a code symbol stamp. The accreditation granted by this certificate is subject to the provisions of the agreement set forth in the application.

COMPANY

ANSALDO ENERGIA SPA
STABILIMENTO DI MILANO
VIALE SARCA, 336
20126 MILANO, ITALY

SCOPE

NA, CLASS 1, 2, 3 & CS INSTALLATION OF COMPONENTS, PARTS,
APPURTENANCES, PIPING SUBASSEMBLIES & COMPONENT SUPPORTS AT
VARIOUS LOCATIONS, SUBJECT TO AUDIT

AUTHORIZED

APRIL 14, 1995

REVISED: AUGUST 17, 1995

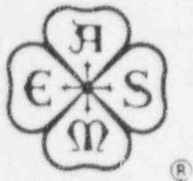
EXPIRES

MARCH 5, 1998

CERTIFICATE NUMBER

N-2861

The American Society of Mechanical Engineers



®

Domenic A. Canonicu

CHAIRMAN OF THE BOILER
AND PRESSURE VESSEL COMMITTEE

Alan Bayne

DIRECTOR, ACCREDITATION AND CERTIFICATION

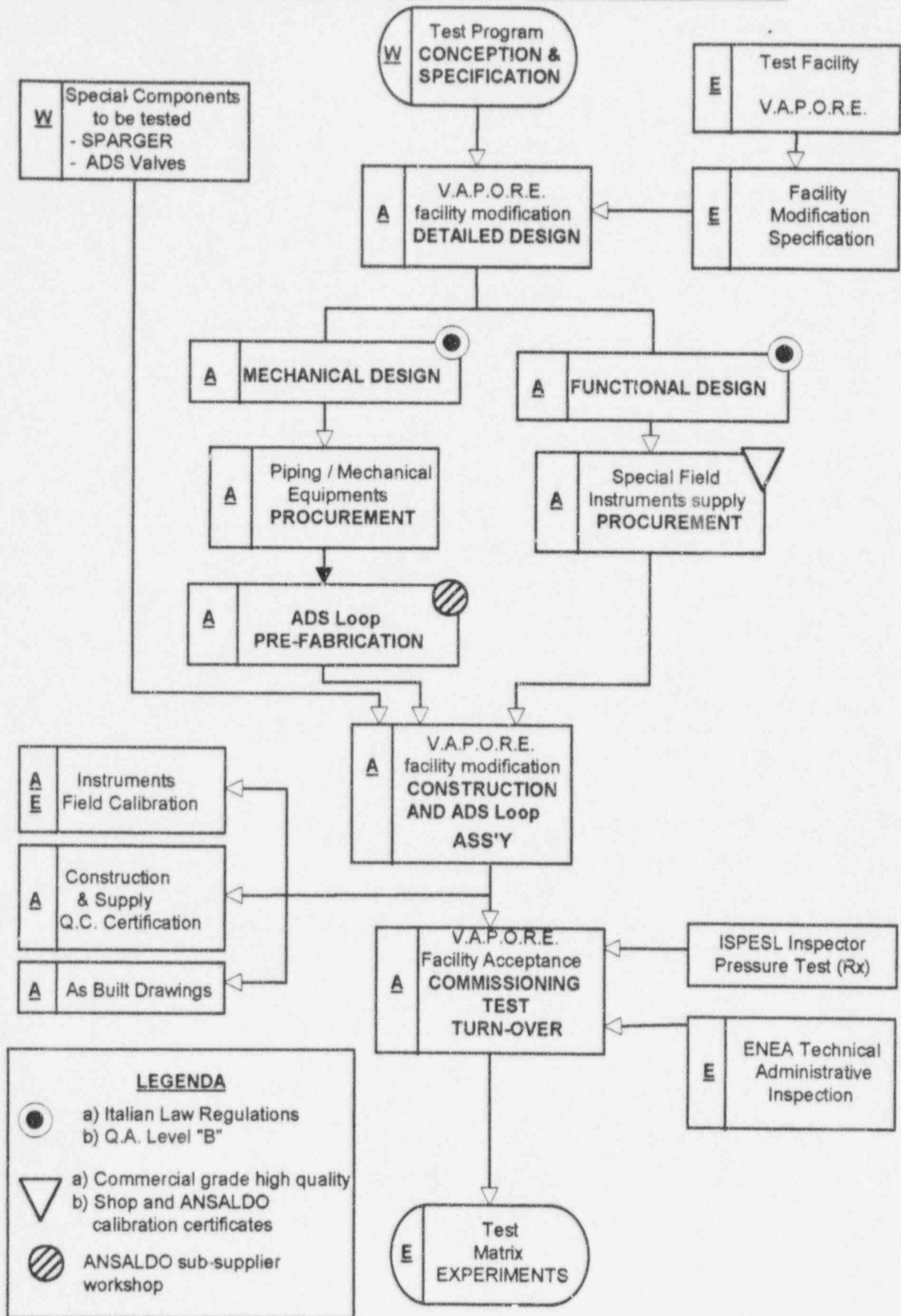
V.A.P.O.R.E. Facility
modifications

ACTIVITY ----- CONTRACT	CONTRACT QUALITY REQUIREMENT	ACTUAL QUALITY SYSTEM
Phase "A" ENEA ---> Ansaldo	Best Engineering Practice	Ansaldo Q.A. Program (*) Technical Documentation
Phase "B-1" ENEA ---> Ansaldo	Best Engineering Practice (fulfills the requirements of Westinghouse Specification)	Ansaldo Q.A. Program (*) Technical Documentation
Phase "B-2" Westinghouse ---> Ansaldo	Westinghouse Specification Ref.: Contract Letter MB-21177-S	Ansaldo Q.A. Program (*) Technical Documentation

(*) According to DNU Quality Assurance Manual

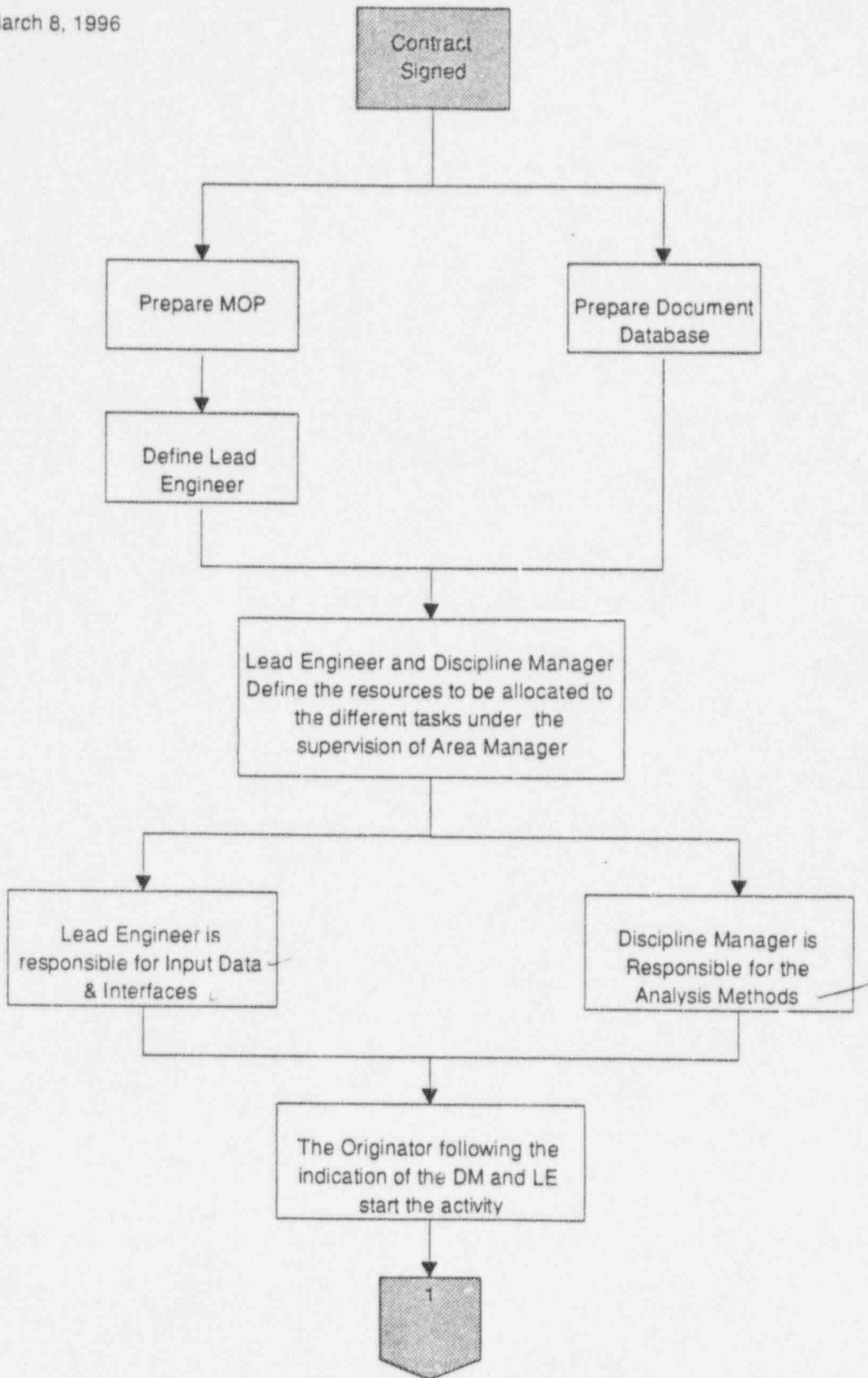
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f

ADS TEST PROGRAM AT V.A.P.O.R.E. FACILITY (ENEA-CASACCIA)



LEGENDA

- a) Italian Law Regulations
b) Q.A. Level "B"
- ▽ a) Commercial grade high quality
b) Shop and ANSALDO calibration certificates
- ◐ ANSALDO sub-supplier workshop



1

The Originator starts to prepare the supporting DRF using the info from LE

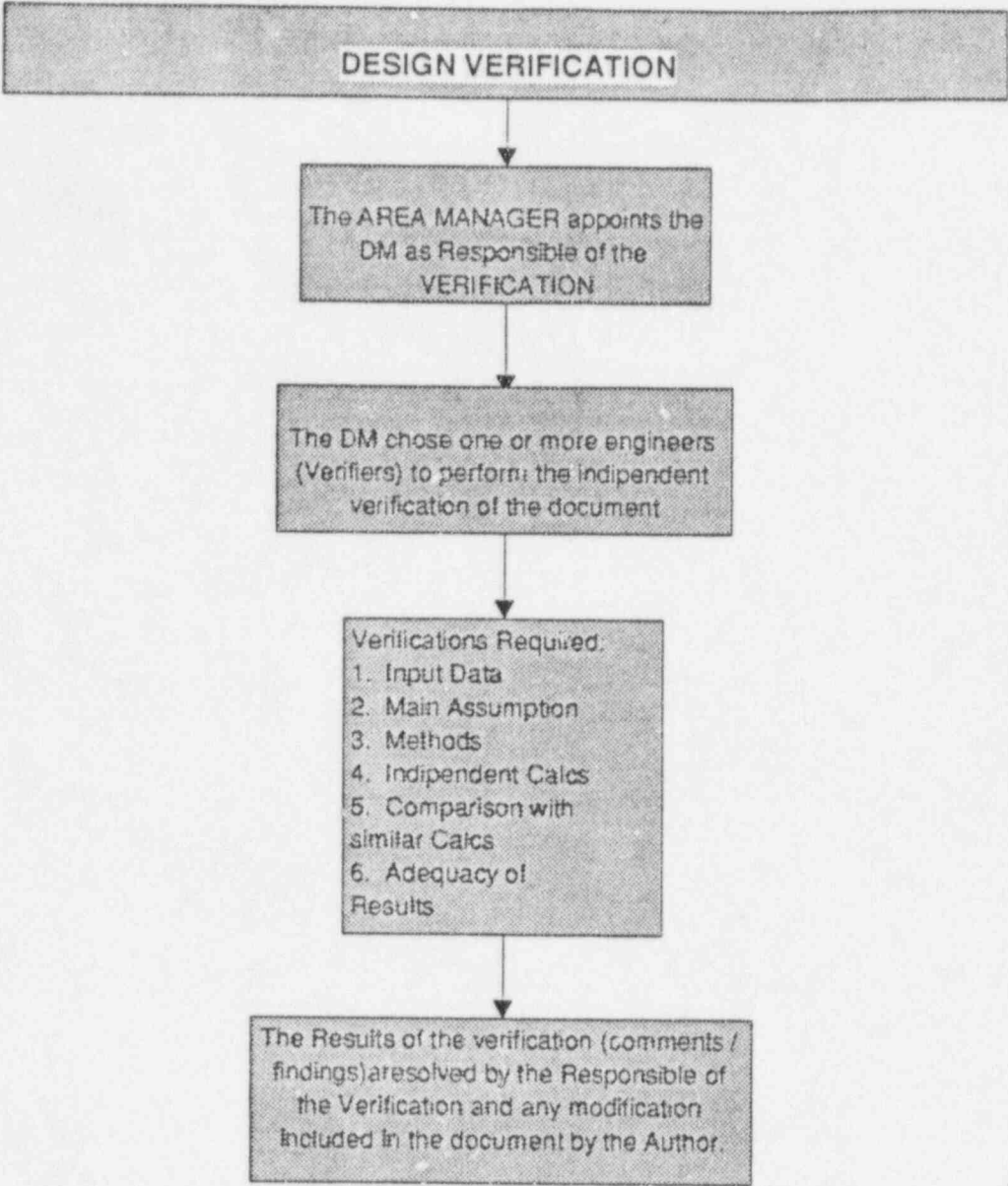
The Author under the guidance of the DM chose the calc. methods (Computer codes etc)

The Author develops the activity interacting continuously with LE and DM

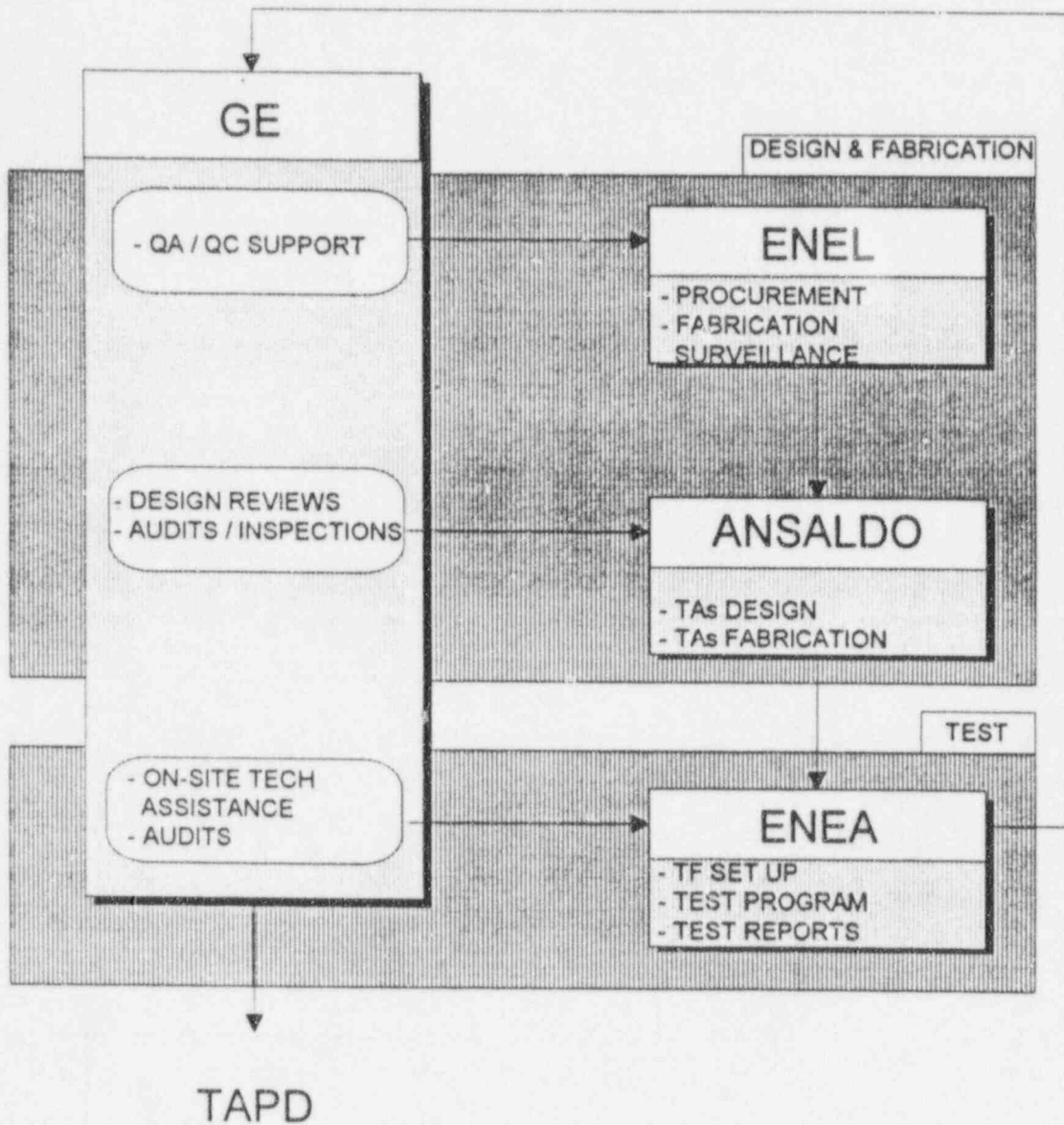
Draft Document Completed and signed by the Author

Draft Document checked by the LE:
Interface & Input Data
Contractual Aspects

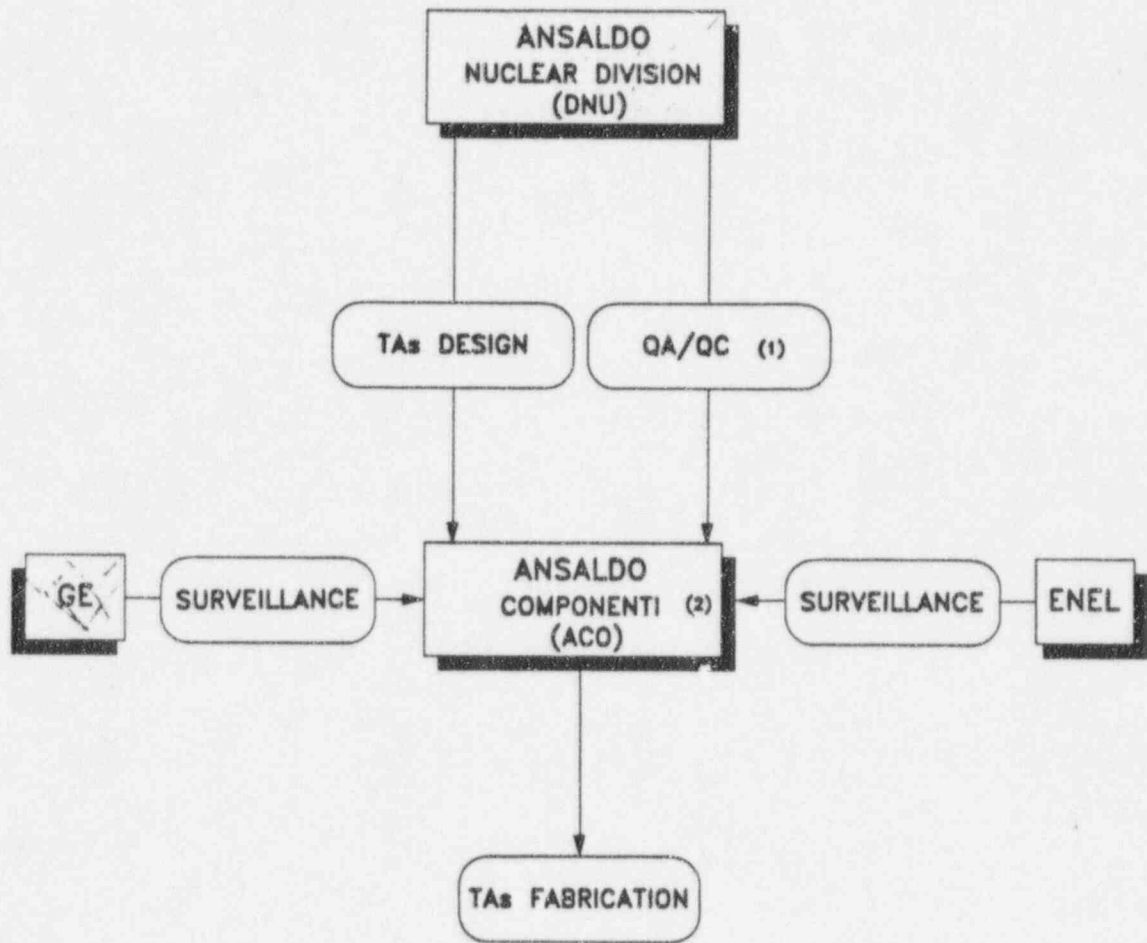
2



PANTHERS 4-PARTY AGREEMENT



IC/PCC FABRICATION : QUALITY CONTROL



- (1) COMPLYING WITH NQA-1/1a, 1983
- (2) N-STAMP HOLDER SINCE LATE SIXTIES