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04 MAY 2006

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ACTION OES-06

INFO OCT-01 EA-07 ISO-00 FEA-01 ACDA-07 CIAE-00 INR-07  
IO-13 L-03 NSAE-00 NSC-05 EB-07 NRC-05 DODE-00  
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FM AMEMBASSY TAIPEI  
TO SECSTATE WASHDC PRIORITY 1999

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E.O. 11652: GDS  
TAGS: TW, IAEA, TECH, ENRG  
SUBJECT: IAEA INSPECTION OF ROC NUCLEAR FACILITIES

REF: (A) TAIPEI 8199, (B) STATE 301 164, (C) IAEA VIENNA A-344

1. ON 15 DECEMBER 1976, EMBOFF DISCUSSED REFERENCE (B) "GENERAL RESULTS" REPORT WITH CAEC SECRETARY-GENERAL VICTOR CHENG. ACCORDING TO CHENG, THE OFFICIAL COPY OF THE REPORT WAS FORWARDED BY IAEA INSPECTOR GENERAL RUDOLF ROMETSCH, TO THE ROC MISSION IN

VIENNA ON 25 OCTOBER. THIS COPY HAS SINCE ARRIVED IN THE ROC, AND ON 3 DECEMBER WAS SENT BY MOFA TO THE ROC EMBASSY IN WASHINGTON, D.C. WITH INSTRUCTIONS THAT IT BE DELIVERED TO THE U.S. STATE DEPARTMENT FOR THEIR REFERENCE. CHENG DID NOT KNOW WHETHER THE REPORT HAD ACTUALLY BEEN DELIVERED.

2. CHENG (PROTECT) GAVE ON "PERSONAL" BASIS A COPY OF THE UNCLASSIFIED REPORT WHICH IS TITLED "TAIWAN INSPECTION REPORT - JULY 1976" AND DATED 12 OCTOBER 1976. THE TEXT OF THE REPORT FOLLOWS.

3. QUOTE: AN INSPECTION, INVOLVING FIVE IAEA INSPECTORS OF THE NUCLEAR FACILITIES AT THE INSTITUTE OF NUCLEAR ENERGY RESEARCH (INER) IN TAIWAN TOOK PLACE DURING JULY 1976. THE PRINCIPAL ACTIVITY DURING THIS INSPECTION, THE DETAILED PLANNING OF WHICH HAD BEGUN IN OCTOBER 1975, WAS THE VERIFICATION OF THE PHYSICAL INVENTORY OF NUCLEAR MATERIAL. THE ACCOUNTING AREAS VISITED WERE:

(A) TAIWAN RESEARCH REACTOR (TRR, AN NRX TYPE NATURAL URANIUM HEAVY WATER)

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(B) FUEL ELEMENT FABRICATION PLANT (NATURAL URANIUM FUEL FOR TRR)

(C) REPROCESSING FACILITY (MTR TYPE FUEL)

(D) PLUTONIUM FUEL CHEMISTRY LABORATORY

COMPLETION OF THE FULL REPORT OF THE INSPECTION WILL REQUIRE SOME WEEKS WORK AS EXTENSIVE DATA PROCESSING OF THE RAW DATA IS NECESSARY. THIS INTERIM REPORT IS INTENDED TO SUMMARIZE THE WORK CARRIED OUT AND TO INDICATE THE CONCLUSIONS THAT CAN BE DRAWN SO FAR.  
TRR RESEARCH REACTOR:

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THE WORK HERE DIVIDED INTO TWO SEPARATE STREAMS: IMPROVEMENT OF SURVEILLANCE MEASURES, AND IRRADIATED ROD GAMMA MEASUREMENTS IN THE COOLING POND TO ESTABLISH THE VERACITY OF PLANT RECORDS.

(A) SURVEILLANCE

THE SURVEILLANCE CAMERAS INSTALLED AT TRR HAVE SHOWED A VARIETY OF FAULTS, INCLUDING SOME WITH THE MECHANICAL TIMERS AND SOME WITH THE CAMERAS THEMSELVES. THESE FAILURES WERE THE REASON FOR THE NEED FOR THE EXTENSIVE GAMMA MEASUREMENTS ON THE IRRADIATED FUEL. THE FAULTY COMPONENTS WERE RETURNED TO HEADQUARTERS FOR DETAILED EXAMINATION AND A NEWLY DEVELOPED, CLOSED CIRCUIT TV SYSTEM WITH TAMPER-INDICATING FEATURES WAS INSTALLED IN THE POND AREA TO PROVIDE AN IMPROVED SURVEILLANCE SYSTEM. PICTURES ARE RECORDED ON MAGNETIC VIDEO TAPE AND CAN BE PLAYED BACK FOR REVIEW IN SITU. EXAMINATION OF THE RECORDED PICTURES FROM THE FIRST TWO MONTHS OPERATION HAS SHOWN THIS SYSTEM TO BE OPERATING VERY SUCCESSFULLY. ADDITIONALLY, IMPROVED SITING FOR THE CAMERAS IN THE REACTOR HALL WAS FOUND GIVING BOTH EASIER ACCESS AND MUCH IMPROVED

## VISION

## (B) IRRADIATED FUEL MEASUREMENTS

THESE MEASUREMENTS INVOLVED USING TWO NEWLY DEVELOPED MULTICHANNEL GAMMA SPECTROMETERS SCANNING AN IRRADIATED FUEL ROD VIA A HOLLOW SEALED TUBE LEADING INTO THE COOLING POND. MEASUREMENTS WERE RECORDED ON MAGNETIC TAPE, FOR SPEED, FOR LATER ANALYSIS AT HEADQUARTERS. THE RODS SCANNED WERE SELECTED AT RANDOM, ONE AT A TIME, IMMEDIATELY PRIOR TO SCANNING. AS WAS THE CASE THROUGHOUT THE INSPECTION, THE OPERATOR PROVIDED EXTREMELY GOOD COOPERATION IN THE INSTALLATION OF THE EQUIPMENT AND MANUFACTURE OF AUXILIARY

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COMPONENTS SUCH AS THE SCANNING TUBE AND ROD HOLDING RIG AND IN THE MOVEMENT AND MEASUREMENT OF THE RODS.

THE PURPOSE OF THE MEASUREMENTS WAS TO ESTABLISH THE IRRADIATION AND COOLING HISTORY OF THE RODS TO VERIFY THE REACTOR RECORDS. APPROXIMATELY HALF THE TOTAL ROD POPULATION IN THE POND WAS MEASURED AND A COMPLETE ITEM COUNT OF THE RODS IN THE POND WAS CARRIED OUT. NO DISCREPANCIES IN THE ROD COUNT WAS FOUND BUT ANALYSIS OF THE GAMMA MEASURES WILL TAKE SOME TIME

## FUEL ELEMENT FABRICATION PLANT:

THE PURPOSE OF THIS INSPECTION WAS TO ESTABLISH THE INITIAL INVENTORY OF THE PLANT AS A PRINCIPAL NUCLEAR FACILITY (PNF) AND IN DOING SO TO ESTABLISH THE USE AND DISTRIBUTION OF SAFEGUARDED SUPPLIED NATURAL URANIUM SUITABLE FOR USE IN TRR. THIS ACTIVITY WAS COMPLEMENTED BY THOROUGH EXAMINATION OF THE FACILITY'S ACCOUNTING RECORDS.

EACH OF THE 439 BILLETS OF URANIUM (85.8 TONS) WAS WEIGHED, ITS SERIAL NUMBER CHECKED, AND A NON-DESTRUCTIVE ANALYSIS (NDA) MEASUREMENT MADE TO VERIFY THAT IT WAS URANIUM. SAMPLES WERE DRILLED FROM SOME OF THE BILLETS FOR LATER CHEMICAL ANALYSIS. ADDITIONALLY, EVERY PIECE OF ACCESSIBLE URANIUM IN PROCESS WITHIN THE PLANT WAS EXAMINED AND WEIGHED OR ESTIMATED.

THE RESULTS SHOW A DIFFERENCE, WHICH IS WITHIN THE INHERENT MEASUREMENT UNCERTAINTIES, OF ABOUT 0.3 TONS BETWEEN THE INSPECTORS' AND OPERATORS' FIGURES IN A TOTAL INVENTORY QUANTITIES OF NUCLEAR MATERIAL RECEIVED BY TAIWAN ON THE BASIS OF INFORMATION PROVIDED BY STATES SHIPPING MATERIAL TO TAIWAN.

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REPROCESSING FACILITY:

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THIS IS A REPROCESSING LABORATORY CONSISTING OF A SINGLE CELL CONTAINING A DISSOLVER AND VERY SMALL MIXER-SETTLER FOR SEPARATION OF FISSION PRODUCTS. THE PURPOSE STATED IN THE DESIGN INFORMATION IS AS AN EXPERIMENTAL FACILITY FOR THE HANDLING OF MTR (MATERIALS TESTING REACTOR) TYPE FUEL ELEMENTS FROM THE EXPERIMENTAL REACTOR ZPRL.

THE PURPOSE OF THE VISIT WAS TO VERIFY THE DESIGN INFORMATION SUPPLIED AS WELL AS TO ESTABLISH THE INITIAL INVENTORY AND WHAT USE WAS BEING MADE OF THE FACILITY.

AT THE TIME OF THE INSPECTION THE 'HOT CELL' WAS OPENED UP TO ALLOW CONSTRUCTION WORK TO BE CARRIED OUT. THE SIZE OF THE CELL AND THE EQUIPMENT WITHIN IT CONFORMED WITH THE DESIGN INFORMATION. THE INSPECTORS CONFIRMED THAT NO ACTIVE MATERIAL HAD EVER BEEN INTRODUCED INTO THE CELL. THE SCALE OF THE CELL AND THE VERY SMALL SIZE OF THE EQUIPMENT INSIDE, OR WHICH COULD BE FITTED IN, PRECLUDE THE POSSIBILITY THAT THE UNIT COULD BE USED FOR SERIOUS PRODUCTION SCALE REPROCESSING.

NO MATERIAL WAS SHOWN AS BEING ON THE PLANT INVENTORY AND THERE WAS NO EVIDENCE OF ANY BEING PRESENT. PLUTONIUM FUEL CHEMISTRY LABORATORY:

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AN INITIAL INSPECTION WAS ALSO MADE AT THE PLUTONIUM FUEL CHEMISTRY LABORATORY WHICH IS PART OF THE INSTITUTE OF NUCLEAR ENERGY RESEARCH (INER) RESEARCH AND DEVELOPMENT FACILITY. THE PURPOSE WAS TO COLLECT INFORMATION FOR PLANNING THE SAFEGUARDING OF THIS LABORATORY AND WAS NOT FOR INVENTORY VERIFICATION. THIS LABORATORY IS NOT A PRINCIPAL NUCLEAR

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FACILITY DUE TO THE RELATIVELY SMALL AMOUNT OF SAFEGUARDED MATERIAL PRESENT. THE LABORATORY CONTAINS FOUR GLOVE BOXES AND INTERCONNECTING PIPEWORK FOR HANDLING AND TRANSFERRING PLUTONIUM LIQUORS. IT ALSO CONTAINS A GLOVE BOX WITH A VACUUM FURNACE

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FOR PRODUCING PLUTONIUM METAL BILLETS.

EXAMINATION OF THE BOOKS PROVED SIMPLE SINCE THE ONLY MATERIAL REPORTED TO BE HANDLED WAS 490 GRAMS OF PU OF USA ORIGIN. THE STATED PURPOSE OF ALL EXPERIMENTS SO FAR CONDUCTED WITH THIS MATERIAL WAS TO EXTRACT AMERICIUM ON AN EXPERIMENTAL BASIS. THIS PU WAS RECEIVED IN JANUARY 1974 AND TO DATE 176 GRAMS ARE STATED TO BE UNACCOUNTABLE DUE TO PLANT HOLD UP IN THE PIPEWORK AND EQUIPMENT IN THE GLOVE BOXES.

THE CHARACTERISTIC PRECIPITATE COLOURING OF PLUTONIUM WAS EVIDENT IN THE VISIBLE FILTERS, ETC., BUT QUANTITATIVE MEASUREMENTS OF THESE SMALL QUANTITIES OF MATERIAL UNDER THESE CONDITIONS WERE NOT PRACTICAL.

IN ADDITION TO THE MATERIAL SUPPLIED IN JANUARY 1974 THE LABORATORY HAD ENTERED ON ITS BOOKS 585 GRAMS OF PLUTONIUM IN THE FORM OF OXIDE SUPPLIED IN NOVEMBER 1974. THIS WAS STATED TO BE STILL IN ITS TRANSPORT CONTAINER, AND IT WAS FURTHER STATED THAT THE MATERIAL HAD NEVER BEEN TOUCHED, BEING STORED AS RECEIVED THROUGHOUT THIS TIME. THE EXTERNAL TRANSPORT CONTAINER WAS EXAMINED BUT NO SEAL HAD BEEN APPLIED BY THE U.S. AUTHORITIES AT THE TIME OF SHIPMENT. ALTHOUGH IT HAD BEEN VERIFIED BY INSTRUMENTS THAT THE CONTENTS WERE PLUTONIUM, NO ATTEMPT WAS MADE DURING THIS INITIAL INSPECTION OF THE LABORATORY TO CONFIRM THE QUANTITY OF PLUTONIUM OXIDE PRESENT. END QUOTE.  
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