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INCOMING TELEGRAM

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S E C R E T SECTION 81 OF 85 TAIPE! 88372

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E.O. 12865: GDS & MAY 1988 (BROWN, WILLIAM)
TAGS: TECH, ENRG, PARM, TY
SUBJECT: U.S. NUCLEAR TECHNICAL TEAM VISIT

REFS: A) AIT/W BOSB, B) AIT/T B118 SECRET

I. ALL TEXT SECRET.

2. SUMMARY: U.S. NUCLEAR TECHNICAL TEAM VISITED TAIWAN 1-5 MAY 1978 FOR DISCUSSIONS WITH AEC AND INER OFFICIALS ON ASSIGNMENT OF U.S. SCIENTISTS TO INER, CONVERSION OF TRE TO 20 PERCENT-ENRICHED FUEL, TRANSFER OF SPENT TRE" FUEL TO U.S., AND STATUS OF INER CHEMICAL PROCESSING PROJECTS INCLUDING ANODE-SLIME AND URANIUM EXTRACTION. ON MARGINS OF MAIN DISCUSSIONS, TEAM TOURED TRR, TRR SPERT FUEL WET AND DRY STORAGE, TRR FUEL FABRICATION, COMPUTER CENTER, HOT LABORATORY, AND AMODE-SLIME LABORATORY FACILITIES AT THER AND THE THER URANTUM-EXTRACTION PILOT PLANT LOCATED AT THE CHINA PHOS-PHATES CORPORATION COMPLEX IN KACHSTUNG. U.S. PROPOSALS FOR ASSIGNMENTS OF U.S. SCIENTISTS TO INER TO AID IN ORGANIZING PLANNING PROGRAMS IN SUPPORT OF THE TAIWAN LWR POWER PROGRAM WERE ENTHUSIASTICALLY RECEIVED BY AEC AND THER OFFICIALS; PRIORITIES FOR THE TECHNICAL AREAS OF THE ASSIGNMENTS WERE JOINTLY AGREED TO. SUBJECT TO REGOLVATION OF EXACT TERMS, THERE APPEARS TO BE A BASIS FOR AN AMICABLE U. S. MAINAH AGREEMENT ON TRE CONVERSION TO 28 PERCENT-ENRICHED HEX U-AL FUEL FIRE U.S. WILL ACCEPTA TWO-STEP CONVERSION PROCESS STEP ONE WOULD BE AN IMMEDIATE CONVERSION (I.E., AS SOON AS PHYSICALLY POSSIBLE -- ABOUT TWO YEARS) OF HALF OF THE CORE TO 28 PERCENT-ENRICHED FUEL. STEP TWO WOULD BE A GRADUAL CONVERSION OF THE

REMAINDER OF THE CORE TO 28 PERCENT-ENRICHMENT OVER A PERIOD OF, SAY, 5. YEARS TO GIVE TIME TO PHASE OUT CURRENT INER KATURAL URANIUM FUEL FABRICATION FACILITY OPERATIONS AND REPLACE THEM WITH OTHER PROJECTS WITHOUT FURTHER. MAJOR SHORT-TERM THER PROGRAM DISLOCATIONS. TAIWAN YOULD ACCEPT FUTURE SYSTEMATIC RANSFER OF SPENT NATURAL URANIUM TRE FUEL TO THE U.S. SO AS TO HAINTAIN PLUTONIUM INVENTORY ON TAIWAN AT SOME ACCEPTABLY LOW LEVEL. THER PERSONNEL WERE HIGHLY COOPERAT, LAND DISCUSSIONS OF PROBLEMS ASSOCIATED WITH TRANSFER OF CURRENT TRE SPENT FUEL INVENTORY TO THE U.S.; PLANS FOR COOPERATIVE U. S. /TAIWAN WORK TO ACCOMPLISH THE TRANSFER WERE AGREED TO. U.S. TEAM PRESENTED LECTURES ON THE THREE MILE ISLAND ACCIDENT AT THER AND IN TATPET AS FRIENDSHIP GESTURE. LECTURES WERE ATTENDED BY LARGE NUMBERS OF THER, AEC, TSING-HUA UNIVERSITY, AND TAIPOWER PERSONNEL -- BOTH LECTURES WERE SRO. THE VISIT RECEIVED NO PUBLICITY IN THE LOCAL PRESS, THUS VALI ATING ASSURANCES THE GONT GAVE US THAT THE TRIP WOULD BE K PT INCONSPIC-UQUS. LAIT'S PRESS SPOKESMAN DID REC IVE ONE JOURHALISTIC INQUIRY FROM FOREIGN CORRESPONDENT AND PROVIDED BASIC DETAILS ALONG LINES OF AGREED GUIDANCE. END SUMMARY. 3. U.S. NUCLEAR TECHNICAL TEAM VISITING TAIWAN 1-5 MAY

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1979 CONSISTED OF PERSONNEL LISTED REFTEL (A) AND FOLLOWED HINERARY EISTED REFTEL (B), WITH THE ADDITIO OF FACILITY TOURS MOTED IN PARA 2.

4. ASSIGNMENTS OF SCIENTISTS: US/DOE LWR R&D PROGRAM
AND U.S. -SUGGESTED TECHNICAL AREAS FOR LWR-DRIENTED
ASSIGNMENTS PROGRAM WERE DISCUSSED GENERALLY AND GIVEN
VERY POSITIVE RECEPTION AT OPENING AND CLOSING SESSIONS
AT AEC, BUT KEY DISCUSSION WAS PRESSESKY/CHIEN/LEVIS
MEETING AT INER 4 MAY. WORKING FROM A LIST OF ELEVEN
U.S. -PROPOSED TOPICS OUT OF WHICH THE FOUR ONE-MONTH
ASSIGNMENTS NOW BEING PLANNED WERE TO BE SELECTED,
REARRANGEMENTS AND CONSOLIDATION OF TOPICS LED TO THE
FOLLOWING JOINTLY-AGREED PRIORITY LIST:

- A. FUEL TECHNOLOGY:
 - E. REACTOR SYSTEMS ENGINEERING;
- c. INSTRUMENTATION;
 - D. DECONTAMINATION, DOSE REDUCTION, AND
- ACCIDENT RECOVERY;
 - E. REACTOR PHYSICS AND SAFETY.

THE U.S. WILL EXPEDITE PREPARATION OF A DETAILED PROPOSAL FOR IMPLEMENTATION OF ASSIGNMENTS BASED ON THIS AGREEMENT FOR EARLY SUBMITTAL TO THER FOR FINAL APPROVAL.

5. TRR CONVERSION: U.S. TEAM PRESENTED MASSIVE DETAILED TECHNICAL REPORT ON THE FEASIBILITY OF TRR CONVERSION TO 28 PERCENT-ENRICHED NRX-TYPE 7-PIN U-AL FUEL COVERING EVERY FEASIBILITY ISSUE RAISED BY INER PERSONNEL AT THE DECEMBER 1978 MEETING AT ARGONNE NATIONAL LABORATORY.

THER PERSONNEL NOW CONCEDE THE TECHNICAL FEASIBILITY OF FULL TAR CORE CONVERSION TO 28 PERCENT-ENRICHED

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HRX 7-PIN U-AL FUEL. INER FORMAL POSITION IS THAT CONVERSION TO HALF 28 PERCENT-ENRICHED NRX FUEL AND HALF CURRENT NATURAL URANIUM FUEL IS ALSO TECHNICALLY FEASIBLE BUT SUPERIOR TO FULL CORE CONVERSION FROM A COST-EFFECTIVENESS POINT OF VIEW BECAUSE IT GIVES NEEDED HIGHER FLUX LEVELS AND DOES NOT MAKE OBSOLETE THEIR TRR FUEL FABRICATION FACILITY AND URANIUM-PHOSPHATE EXTRACTION PROGRAM. U.S. FORMAL POSITION IS THAT HALF CORE CONVERSION IS TECHNICALLY FEASIBLE BUT INFERIOR TO FULL CORE CONVERSION BECAUSE FULL CONVERSION GIVES HIGHER FLUX LEVELS, HIGHER EXPERIMENTAL REACTIVITY LOAD CAPACITY, AND LOWER PLUTONIUM PRODUCTION. INER PERSONNEL, INCLUDING DIRECTOR CHIEN, TOLD U.S. TEAM INFORMALLY THAT THEY NOW BELIEVE THAT TRE IN ITS CURRENT CONFIGURATION DOES NOT GIVE HIGH ENOUGH FLUX TO HEET REQUIREMENTS FOR LYR FUEL TESTING ASSIGNMENTS THEY EXPECT WILL BE MADE TO INER FROM TAIPOWER THROUGH AEC:

- I.E., IMER HEEDS AT LEAST PARTIAL CONVERSION OF TRR TO HIGHER ENRICHMENT FUEL TO ACHIEVE REEDED FLUX LEVELS. DURING PRIVATE CHIEN/LEVIS DISCUSSIONS FOLLOWING UP ON THESE POINTS, CHIEN CONCEDED THAT HIS RESISTANCE TO PHASING OUT THE USE OF NATURAL URANIUM FUEL WOULD BE HUCH LESS IF TIME, AND U.S. ASSISTANCE, WERE AVAILABLE TO FIND REPLACEMENT PROJECTS ISUCH AS NRX-TYPE U-AL FUEL FA-RICATION) FOR THE THER TRR FUEL FABRICATION PLANT. THIS LED TO DISCUSSION OF A POSSIBLE BASIS FOR A U.S. /TAIWAN COMPROMISE ON THE TRR CONVERSION ISSUE AS OUTLINED IN PARA 2. U.S. FINAL POSITION IN TRE TALKS WAS THAT THE CONVERSION FEASIBILITY STUDY WAS COMPLETED, THAT HEXT STEP WOULD BE A FORMAL U.S. PROPOSAL FOR DISPOSITION OF THE TRE CONVERSION ISSUE, AND THAT, AFTER A DECISION IS MADE ON CONVERSION GOALS, INITIATION OF AN IMPLEMENTATION PROGRAM WOULD BE APPROPRIATE. PARA 6 DOCUMENTS THE JOINTLY AGREED U.S. /TAIWAN STATEMENT ON CONVERSION DECISION ISSUES AND SUBSEQUENT IMPLEMENTATION
- 6. SUMMARY OF RESULTS OF TRE CONVERSION DISCUSSIONS AT INER HAY 2-4, 1979: AT THE HEETING AT INER, HAY 2-4, 1979. THE STUDY TEAMS FOR TRE CONVERSION FROM INER AND FROM THE U.S. DISCUSSED ALTERNATIVE OPTIONS FOR POSSIBLE CONVERSION OF TRE. AMONG THE ITEMS DISCUSSED WERE THE IMPORTANT ISSUES TO BE CONSIDERED IN THE FINAL DECISION ON WHETHER OR NOT, OR IN WHAT WAY, TO CONVERT THE REACTOR. ALSO DISCUSSED WERE SOME OF THE MAJOR STEPS THAT WOULD HAVE TO BE TAKEN TO IMPLEMENT THE CONVERSION IF AND WHEN A DECISION TO CONVERT WERE MADE. THESE DECISION ISSUES AND IMPLEMENTATION STEPS ARE SUMMARIZED BELOW.
- (A) IMPORTANT ISSUES FOR FINAL DECISION ON TRR CONVERSION
- (1) A FURTHER STUDY TO SEARCH FOR AN OPTIMUM CORE UNDER THE FOLLOWING GUIDELINES:
- - NIGHER FLUX AND REASONABLE CYCLE LENGTH ENOUGH TO PERFORM REACTOR FUEL DEVELOPMENT;

- -- CONTINUOUS UTILIZATION OF THER EXISTING FACILITIES AND MATERIALS;
- -- MINIMUM MODIFICATIONS TO THE PRESENT TRR SYSTEM;
- -- COMPREHENSIVE SFAETY ASSURANCE.
- (2) A TOTAL COST-BENEFIT ANALYSIS OF THE DETINUM CONVERSION.
 - (B) TRR CONVERSION IMPLEMENTATION STEPS
 - (I) FINANCIAL ARRANGEMENTS AND SCHEDULE
- PROVISIONS SHOULD BE HADE FOR THE MODE IN WHICH FUNDS ARE HADE AVAILABLE FOR FUEL AND COMPONENT PROCUREMENT, SHIPMENTS, ETC. A DETAILED SCHEDULE FOR EYERY ACTIVITY OF THE CONVERSION SHOULD BE DEVELOPED.
 - (2) SELECTION OF CORE CONFIGURATION
- A SERIES OF CALCULATIONS SHOULD BE PERFORMED WITH CONSISTENT METHODOLOGY TO ANALYZE TRADEOFFS IN EXPERIMENTAL LOAD, NEUTRON FLUX, CYCLE LENGTH, PLUTDNIUM PRODUCTION, AND FUEL REQUIREMENTS FOR VARIOUS FEASIBLE CONFIGURATIONS OF THE CONVERTED TRR. THESE CALCULATIONS WILL PROVIED THE BASIS FOR CHOOSING THE INITIAL CORE. LOADING, THE REQUIRED FUEL INVENTORIES, THE REQUIREMENTS FOR ADDITIONAL SHUTOFF AND ADJUSTER RODS, AND THE HEEDS FOR REACTOR MODIFICATIONS (E.G., MODIFICATIONS OF THE MODERATOR COOLING SYSTEM, TO THE CONTROL PANEL, AND TO THE ADJUSTER ROD HEADGEAR).

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(3) PREPARATION OF AN AMENDED FSAR

A SET OF AMENDMENTS TO THE TRR FSAR SHOULD BE PREPARED. THIS ACTIVITY WILL INCLUDE ON A DEFINITION . OF THE LIMITING FUEL CONDITIONS BASED ON FINAL REACTOR COMFIGURATIONS: AN EVALUATION OF THE PROTECTION SYSTEM FOR A RANGE OF POSTULATED RANF RATES CHARACTERISTIC OF THE CONVERTED TRR: ANALYSIS OF THE EFFECTS OF A VARIETY OF POSTULATED LOSS OF LOOP COOLANT ACCIDENTS; AND A HAZARD ANALYSIS "ISAFETY EVALUATION" IN WHICH THE FISSION PRODUCT INVENTORY SHOULD BE CALCULATED, AND POTENTIAL RADIOLOGICAL EXPOSURE SHOULD BE DETERMINED AS RELATED TO EXPOSURE LIMITS AND BASED ON POSTULATED REACTOR ACCIDENTS.

(4) CONTROL SYSTEM

THE ADEQUACY OF THE PRESENT TRE CONTROL SYSTEM IN THE CONVERTED CORE SHOULD BE EVALUATED, AND MODIFICATIONS SMOULD BE DETERMINED, IF WEEDED.

5) FUEL AND CONTROL ROD PROCUREMENT

BASED ON THE NUMBER OF FUEL RODS, SAFETY RODS, AND ADJUSTER ROOS TO BE PROCURED, ON THE SELECTION OF THE PAYMENT MODE AND ON THE DETAILED CONVERSION SCHEDULE, THE PROCUREMENT ACTIVITY SHOULD INCLUDE SELECTION OF QUALITY LEVEL CRITERIA AND OF TESTING AND ACCEPTANCE CRITERIA; DETERMINATION OF CONTRACT SUARANTEE CLAUSES AND AUDITING PROCEDURES; PREPARATION OF DETAILED COST ESTIMATES; SIGNING OF CONTRACTS; EARLY PROCUREMENT OF FUEL SAMPLES FOR METALLURGICAL, MECHANICAL, AND THERMAL-HYDRAULICS TESTING; AND, FINALLY, SHIPMENT AND DEVLIVERY OF FIRISHED PRODUCTS.

(6) PROCUREMENT OF REACTOR COMPONENTS

DEPENDING ON THE FEATURES OF THE SELECTED REACTOR CONFIGURATION, SOME MODIFIED REACTOR COMPONENTS MAY REED TO BE PROCURED. THESE COMPONENTS HAY INCLUDE ADDITIONAL MODERATOR HEAT EXCHANGERS, AND MODIFICATIONS TO THE CONTROL PANEL AND TO THE ADJUSTER ROD HEADGEAR. (7) OPERATING PROCEDURES

A NEW SET OF OPERATING PROCEDURES SHOULD BE DEVELOPED. IN PARTICULAR, REACTIVITY CONSIDERATIONS RELATED TO OPERATIONAL SAFETY (SEE PP. A-13 TO A-22 OF AHL REPORT, APRIL 1979) SHOULD BE DEVELOPED. START-UP PROCEDURES SHOULD ALSO BE DEVELOPED, ALONG WITH THE PRO-TEDURES TO BE FOLLOWED IN ACKIEVING THE FIRST LOADING. THE LATTER PROCEDURES SHOULD CONSIDER GRADUAL INSERTION OF THE NEW FUEL RODS IN THE CORE, TO TEST THEIR PER-FORMANCE AND THE ACCURACY OF THE CALCULATIONS ON WHICH THE CONVERSION IS BASED.

7. TRE SPENT FUEL TRANSFER: A JOINT DOE/INER PROGRAM TO DEVELOP A PLAN FOR THE TRANSFER OF TRR SPEHT FUEL TO THE U.S. WAS DISCUSSED. AREAS OF U.S. AND TAIWAN PLANNING RESPONSIBILITY WERE IDENTIFIED AS WERE THE STEPS REQUIRED TO IMPLEMENT THE TRANSFER. PARTICIPATING IN THE SPENT FUEL DISCUSSIONS WERE: DR. WU SHAW-CHIL, DEPUTY DIRECTOR

OF INER, DR. J. C. CHOU, DEPUTY DIRECTOR INER, DR. FANG WAN-CHENG, SUPERINTENDENT OF THE TRR, S. CEJA, DOE/IA, AND G. SYRTD USBARDLTYLTDSYAAUD KPE WOWMS SAVANHAH RIVER

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PLANT. REVIEW OF TRR FACILITIES REVEALED THAT THE CASK LOADING POOL AND ITS ACCESS PORTS WERE NOT L'ARGE ENOUGH TO ACCOMMODATE A CASK OF THE SIZE REQUIRED TO EFFICIENTLY TRANSPORT THE FUEL TO THE U.S. THEREFORE, IT WAS DETER-MINED THAT PLANS AND PROCEDURES HAVE TO BE DEVELOPED FOR THE DRY TRANSFER OF FUEL FROM THE TRANSFER CASK TO INE LARGER SHIPPING CASK. THE WEIGHT OF THE SHIPPING CASK REQUIRED IS OF THE ORDER OF 25 TO 38 TONS. TRR BUILDING CRANE COULD HANDLE THIS WEIGHT. TRANSFER OF THIS FUEL TO THE U.S. WILL BE A COMPLEX UNDERTAKING. FOR THIS REASON, IT WAS AGREED THAT THE JOINT EFFORT WOULD BEGIN WITH THE FORMULATION OF A PLAN DESIGNED TO HANDLE SOUND SPENT FUEL INITIALLY. INER REPRESENTATIVES ESTIMATE THAT FAILED FUEL COMPRISES IS PERCENT OF SPENT FUEL INSTORAGE. THE PLAN CALLS FOR PERIODIC COORDINATING MEETINGS -- THE FIRST TENTATIVELY SCHEDULED FOR HID-SUMMER. INER WAS REQUESTED AND OFFERED TO PROVIDE INFORMATION NEEDED FOR THE SAFETY ANALYSIS REPORT COVERING THE TRANSFER. THIS INCLUDED: DATA ON THE NUMBER OF LEAKING RODS IN STORAGE, THE CALCULATED HEAT LOAD PER ROD FOR SELECTED INTERVALS AFTER REHOVAL FROM THE REACTOR, AND A COPY OF THE TRR TRANSFER CASK DRAWINGS. a. ANODE SLIME PROJECT: THIS PROJECT IS NOW SEEN AS A THREE-PHASE PROJECT OF WHICH THE FIRST PHASE, PROCESS DEVELOPMENT AT INER, IS JUST NOW COMPLETED. PHASE TWO ESTIMATED TO TAKE ABOUT ONE YEAR), SCALE-UP STUDIES AT IMER OF PARTICULAR SUB-UNITS OF THE PROCESS, AND PHASE THREE, INSTALLATION AT THE TAIWAN METAL MINING CORP. (THIC) OF A 285-TON (SLINE) PER YEAR BATCH-PROCESS PLANT. WILL GET UNDERWAY AS SOON AS THE CONTRACT WITH THMC IS SIGNED. CONTRACT SIGNING WILL BE NEXT WEEK. THE SLINE COLLECTED AT THE AHODE (POSITIVE TERMINAL) OF THE ELECTROCHEMICAL COPPER REFINING PROCESS CONTAINS SIGNIFICANT AMOUNTS OF GOLD, SILVER, SELENIUM, AND OTHER VALUABLE METALS. COMMONLY USED PROCESSES FOR EXTRACTION OF THESE METALS ARE COSTLY AND ENERGY INEFFICIENT, HAVE LOW EXTRACTION FRACTIONS, AND ARE AIR POLLUTION PROBLEMS. THE THER SOLVENT-EXTRACTION MROCESS IS CLAIMED TO BE

NOTE BY OC/T: TAIPE! 372 (SEC 3 OF 5). #AS RECEIVED. PARA 7, LINE 9. CORRECTION TO FOLLOW.

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SUPERIOR ON ALL THESE POINTS. PROCESS DEVELOPMENT IS UNDER THE DIRECTION OF D. TSAI (A GROUP LEADER LEADING ABOUT 3 TECHNICIANS) IN THE CHEMICAL ENGINEERING DIVISION; HE IS SUPERVISED BY DR. WANG VEI KO, DIRECTOR OF THAT DIVISION, AND DR. TING, DIRECTOR OF THE CHEMISTRY DIVISION. THE WORK IS BEING CONDUCTED ADJACENT TO THE HOT CELL BUILDING IN THE HOT DEVELOPMENT LABORATORY BUILDING (B14) THAT FORMERLY HOUSED THE HINI-SCALE MIXER-SETTLER NUCLUJ FUEL REPROCESSING PLANT. THE NEARLY ABANDONED BUILDING IS IN A STATE OF RUSTING DISREPAIR AND DEVOID OF THE RADIATION AND CONTAMINATION MONITORING ANDCONTROL EQUIPMENT CHARACTERISTIC OF FUEL REPROCESSING AREAS.

FUEL REPROCESSING AREAS. 9. URANIUM RECOVERY FROM PHOSPHORIC ACID: ON MAY 5, MEMBERS OF THE U.S. TEAH HET KUD TSAI-SHU, INER PROJECT LEADER AND DESIGNER OF THE URANIUM EXTRACTION PROJECT, AT THE TAIPEL AIRPORT TO BE ESCORTED TO THE CHINA-PHOSPHATE COMPANY'S (CPC) PLANT IN KACHSTUNG TO REVIEW THE PILOT-SCALE URANIUM RECOVERY PLANT. THE STATED MAJOR OBJECTIVE OF THE URAHIUM RECOVERY PROCESS IS TO REMOVE THE URANIUM CONTAMINATION FROM THE DI-CALCIUM PHOSPHATE PRODUCED AT CPC, WHICH SERVES AS A SUPPLEMENT IN THE FEEDING OF LIVESTOCK. THE URANIUM RECOVERED FROM THE PROCESS IS IN THE FORM OF AN AMMONIUM URANYL PHOSPHATE (AUP) WHICH IS SHIPPED TO INER FOR SUBSEQUENT PURIFICATION. THE CAPACITY OF THE PILOT-SCALE FACILITY IS 2.4 KG PER DAY (U) AND WAS STARTED UP ON HARCH 28, 1979. APPROXIMATELY 28 KG OF MATERIAL HAS BEEN SHIPPED TO INER TO DATE. CPC OPERATES, MANAGES, AND MAINTAINS THE PILOT PLANT; THE INER STAFF PROVIDES TECHNICAL GUIDANCE. FUTURE SCALE UP INCLUDES THE DESIGN OF A 18-TON PER YEAR PRODUCTION FACILITY TO BE LOCATED ADJACENT TO THE PILOT FACILITY. THE URANIUM PRODUCT WILL BE TRANSPORTED TO THER WHERE PURIFICATION AND CONVERSION IS BEING PLANNED UNDER THE DIRECTION OF DR. SHEY. MR. KUD IS CURRENTLY HEGOTIATING WITH-CPC AND THE CHINA TECHNOLOGY CONSULTANTS (CTC) TO DESIGN AND CONSTRUCT THE URANIUM PRODUCTION PLANT AT KAOHSIUNG.

HR. KUO WHO HEADS THIS PROJECT, IS AN EXPERIENCED CHEMICAL ENGINEER WHO HAS WORKED IN NUMEROUS CHENICAL PROCESS INDUSTRIES. THE CURRENT STAFF UNDER HIS DIRECTION CONSISTS OF A TOTAL OF 38 MEMBERS. THIS STAFF CONSISTS OF 7 ENGINEERS, 13 TECHNICIANS, AND SUPPORT STAFF. FOLLOW-ING HR. KUO'S PRESENT ASSIGNMENT, HE WILL BE ASSIGNED TO THE "HEAVY-SAND" PROCESS RECOVERY OF RARE-EARTHS FROM MONZANITE SAND) ALONG WITH HIS STAFF. THE PROCESS FOLLOWS THE SAME BASIC FLOWSHEET DEVELOPED AT ORML AND EMPLOYS DZEHPA-TOPO AS THE EXTRACTANT. SEVERAL MODIFICATIONS AIMED AT PROCESS IMPROVEMENT WERE NOTED DURING THE TOUR OF THE PILOT PLANT. PROCESS EQUIPMENT OBSERVED INCLUDES 2-CYCLES OF FIBERGLASS MIXER-SETTLER SOLVENT-EXTRACTION CONTRACTORS, SOLVENT CLEAN-UP EQUIPMENT, PRECIPITATORS, AND HISCELLANEOUS AUXILLIARY EQUIPMENT TO SUPPORT THE ABOVE PRIMARY UNIT OPERATIONS. THE PILOT FACILITY IS OPERATED ON A THREE-SHIFT BASIS, STAFFED BY TWO ANALYTICAL TECHNICIANS AND THREE OPERATORS.

18. HEY THER PROJECTS OF INTEREST: WHEN THE SLIME AND

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URANIUM PROJECTS WIND DOWN, INER PLANS TO PLACE EMPHASIS ON FURTHER DEVELOPMENT OF AM INER SOLVENT EXTRACTION PROCESS FOR SEPARATING RARE EARTH ELEMENTS FROM MONZANITE HEAVY SAND FOUND ON THE COAST OF TAIWAN. THEY SAID THEY WERE NOT INTERESTED IN THORIUM EXTRACTION IN THIS PROJECT. DR. CHIEN ASKED IF THE U.S. WOULD SUPPORT INER RESTARTING THE URANIUM/THORIUM CONVERSION PROJECT, WHICH WAS DISCONTINUED AT U.S. REQUEST, IN THE FORM OF DEVELOPMENT WORK ON THE DEMATURED FUEL CYCLE. HE SAID HE THOUGHT THE U.S. STRONGLY SUPPORTED THIS TYPE OF WORK.

11. YIST TO BOT LABORATORY \$28): A TOUR OF THE HOT LABORATORY FACILITY WAS TAKEN ON MAY 4. 1979. THIS FACILITY APPEARED TO BE WELL DESIGNED AND ALL OF THE EQUIPMENT USED FOR THE EXAMINATIONS OF SPENT FUEL WAS IN PLACE AND OPERATING. THE FACILITY CONTAINS HEAVILY SHIELDED (3-FOOT) WALLS COMPOSED OF HIGH DENSITY CONCRETE AND ARE SEGREGATED BASED ON THE METALLURGICAL EXAMINATIONS REQUIRED FOR SPENT FUEL STRUCTURAL STUDIES. DURING THE YISIT, AN IRRADIATED TER ROD WAS BEING GAMMA-SCANNED TO DETERMINE FUEL-COLUMN INTEGRITY. SEGMENTING EQUIPMENT WAS IN PLACE AND OPERATING. SPACE HAS BEEN ALLOCATED FOR CREEP-TEST DEVICES IN ONE OF THE LARGER CELLS. FUEL RODS MAY BE MOVED FROM THE TRR TO THE FACILITY IN A NEW STAINLESS-STEEL END-LOADING TRANSFER CASK. THE CONTAINMENT OF THE VARIOUS AREAS WAS IN ACCORD WITH U.S. PRACTICES; ZONING IS PRACTICED AND ADEQUATE OFF GAS AND WASTE SYSTEMS HAVE BEEN PROVIDED TO SERVICE THE FACILITY. CLOSED CIRCUIT TY IS EMPLOYED FOR PERSONNEL SURVEILLANCE.

12. COMPUTER CAPABILITY: THE COMPUTER SYSTEM SHARED BY INER AND CHUNGSHAM INSTITUTE IS A CYBER 78 MODEL

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73-28. THIS CDC SYSTEM HAS A CORE MEMORY OF 131072 60-BIT WORDS AND A DUAL CPU. THE EFFECTIVE CPU SPEED IS 1.2 MIPS, LESS THAN .4 OF CDS 6600. THE OPERATING SYSTEM IS NOSBE WITHOUT ANY LOCAL MODIFICATIONS AND THE SYSTEM SOFTWARE IS STANDARD CDC PRODUCT LINE. I/O CAPABILITY INCLUDES SIX SINGLE DENSITY MODEL 844 DISK PACKS AND FOUR TAPE DRIVES. THE SYSTEM IS OPERA THE SYSTEM IS OPERATED ALMOST EXCLUSIVELY IN BATCH MODE WITH MOST ACCESS THROUGH CARD INPUT OVER THE COUNTER. REMOTE ACCESS IS LIMITED BUT AVAILABLE BOTH ON-SITE AND AT VARIOUS LOCATIONS ON THE ISLAND; E.G., WEATHER RESEARCH AT TAIPEI. THE COMPUTER SYSTEM IS PRESUMABLY THE LARGEST FACILITY A STAFF OF 20 IS RESPONSIBLE FOR ON THE ISLAND. COMPUTER OPERATIONS, INCLUDING SYSTEM AND SOFTWARE MAINTENANCE. THERE APPEARS TO BE TOTAL RELIANCE ON CDC PERSONNEL FOR DETAILED HARDWARE AND SOFTWARE TROUBLE-SHOOTING -- 2 CUSTOMER ENGINEERS ON SITE THEN PERSONNEL IN TAIPEI, JAPAN, AND U.S. THE COMPUTER IS SAID TO RUN 24 HOURS PER DAY, BUT THIS IS MISLEADING IN THAT NO ACCESS TO THE MACHINE IS PERMITTED OTHER THAN STANDARD WORK DAY AND VERY SMALL, IF ANY, STAFF ARE AVAILABLE ON OFF-SHIFTS. THEY SAY THAT ONE RECENT MONTH SHOWED 600 CPU-HOURS. THIS STATISTIC IS USED TO SUPPORT A CLAIM OF SATURATION AND THE NEED FOR NEW HARDWARE. ALTH-UGH THERE IS A SUGGESTION THAT THEY WOULD RETAIN A CDC SYSTEM IF A NEW MACHINE WERE LEASED OR PURCHASED (MENTION WAS MADE OF A CYBER 75), IT SEEMS CLEAR THAT THEY DO NOT HAVE A MAJOR SOFTWARD INVESTMENT WHICH WOULD PRECLUDE SWITCHING TO ANOTHER U.S. OR JAPANESE_COMPUTER SYSTEM.

VISIT TO TRR FUEL FABRICATION PLANT: THIS PLANT IS NEW AND MODERN WITH ABOUT 50, 000 SQUARE FEET OF FLOOR SPACE. EQUIPMENT IS TOP QUALITY FRENCH-BUILT (CERCA). VALUE IS PERHAPS U.S. DOLLAR 7-9 MILLION FOR THE BUILDING AND U.S. DOLLAR 6-10 MILLION FOR EQUIPMENT. LURGIST, MR. KUNG, HEADS THE FACILITY; HE CLAIMS TO HAVE 40 STAFF PERSONNEL. TRR NATURAL URANIUM FUEL PRODUCTION CAPABILITY IS ABOUT 200 RODS PER YEAR, AND THEY CLAIM TO BE OPERATING AT THIS LEVEL. THE FACILITY IS READILY ADAPTABLE TO VIRTUALLY ANY OTHER TYPE OF FUEL FABRICATION OPERATIONS (U-AL, UO2, ETC.) WITH INSTALLATION OF A FEW KEY PIECES OF NEW EQUIPMENT. BROWN

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