JWM 9/22

PHILLIPS PETROLEUM COMPANY
Atomic Energy Division
Idaho Falls, Idaho

721411

REPOSITORY INEL
COLLECTION SNAPTRAN
BOX No. P-24724, RSR # P-2133
TAN MONTHLY REPORTS FOR 1965
FOLDER TAN-SPERT H.P. PROGRESS REPORT FOR 8/65

September 16, 1965

TAN-SPERT Health Physics Progress Report for August, 1965
Cord-48-65A

Mr. J. W. McCaslin
O F F I C E

The monthly report of TAN-SPERT Health Physics Section for August, 1965, is as follows:

GENERAL

Effective August 1, 1965, the TAN Health Physics Section was reorganized into the TAN-SPERT Health Physics Section. This section is composed of the STEP Health Physics Group, the SPERT Health Physics Group, the TSF Health Physics Group which includes the TSF Decontamination Team and a newly formed Radiological Engineering Group.

The new section will report directly to the Manager of the Health and Safety Branch.

Coincident with this reorganization the TAN-SPERT Health Physics Section will assume responsibility for reviewing all construction drawings for SPERT-STEP reactor projects with respect to health physics and for seeing that all required Health and Safety approvals are obtained before signing off on the drawings.

Additionally the newly formed Radiological Engineering Group will assume the responsibilities of providing Radiological Engineering Services for Phillips prepared Safety Analysis Reviews, and for providing Radiological Environmental Monitoring service for measuring releases of fission products to the environment from STEP and SPERT reactor tests.

Commencing with this report the SPERT Monthly Health Physics report will be included in the TAN-SPERT Section Report.

TSF

The major activities requiring HP coverage in the TSF area during August were:

1. Decontamination room construction coverage
2. PM-2A work in the Hot Shop
3. STEP fuel transfer into the 607 vault
4. Coverage of RML and HCA
5. Movement of fuel from the TAN-607 storage basin
6. Survey of equipment in the RPSSA area

1156218

DECONTAMINATION FACILITIES

Construction personnel finished the installation of the stainless steel floor and returned the area to PPCo. This new floor will reduce the background radiation exposures and will facilitate floor decontamination.

The major items decontaminated, chemically cleaned or sandblasted during August include:

a. 10 casks
b. PM-2A ultrasonic testing equipment
c. Kellog construction tools and equipment
d. PM-2A tools and equipment
e. EG&G support stand
f. G.A. EBOR tank
g. GE glove box
h. tools and equipment from Salt Mine capsule
i. Hot Shop manipulator parts
j. 18 emergency lamps

STEP

Following installation of the SNAPTRAN-1 vessel top head, thermal box head, and thermal box doors, a series of cascade STEP transients were performed. Each group consisted of a series of transients in sequence with each succeeding test starting at a higher starting temperature. A maximum average core fuel temperature of 1340° F was obtained.

On August 11, 1965, the SNAPTRAN-1 reactor fuel was removed from the vessel. The fuel pins were reading greater than 25 r/hr at contact, with no visible fuel deformation or damage observed. By using fuel handling tools and a number of STEP personnel for restricted periods of time the maximum exposure received by any one individual was less than 300 mr. The maximum radiation level measured at the edge of the empty vessel was 300 mr/hr. Results of a contamination survey indicated a maximum of 1300 d/m/100 cm^2 inside the empty containment vessel, 25,000 d/m/100 cm^2 on the gold surfaced areas on the bottom section of the reactor and no significant radioactive contamination was detected on the reactor superstructure.

On completion of the unloading of the core and removal of instrumentation the reactor and test dolly were transported to the Warm Shop, TAN-607, where the SNAPTRAN-1 reactor and all associated equipment were removed. The SNAPTRAN-2 test package has been placed on the test dolly in the TAN-607 area. This reactor will be used for the destructive test scheduled for November.

On August 31, 1965, approximately three weeks following the SNAPTRAN-1 core removal, a series of radiation measurements were taken on five of the fuel elements used during the previous testing program, to determine the

feasibility of performing chemical and physical analysis of the fuels. The measured radiation levels are listed in the following table:

Fuel Element No.	Contact	10 cm	100 cm
#192	2,050 mr/hr	700 mr/hr	16 mr/hr
#211	14,000 mr/hr	3,750 mr/hr	95 mr/hr
#246	14,000 mr/hr	4,000 mr/hr	100 mr/hr
#275	9,000 mr/hr	2,550 mr/hr	55 mr/hr
#277	12,500 mr/hr	3,250 mr/hr	80 mr/hr

SPERT

Following ID approval of the operating limits and Test Series Proposal, preparations were made for loading the Capsule Driver Core in SPERT IV. Initial fuel loading began on August 31 and will continue in a piece meal operation until approximately 1600 pins are loaded. Static Tests will then be performed to determine the nuclear characteristics of the assembly. During loading operations the maximum radiation detected was 15 mr/hr on a basket of 60 pins.

SPERT II reactor is non-nuclear and the building is being used for storage of radioactive equipment to reduce the clutter at SPERT III and IV. Air and area monitors are being maintained operational for the protection of personnel who are performing minor repair functions on items from other reactors.

UNUSUAL OCCURRENCES

On the afternoon of August 27, 1965, low level alpha contamination was tracked from a ribboned work area in the southwest corner of the SPERT control center to adjoining work areas and halls. A small area around a hood had been established as a controlled area with entrance limited to personnel with lab jackets and shoe covers. Fuel pins were being machined and caps welded to the ends. Alpha contamination up to 70 d/m was found on the shoes of two men. The shoes were successfully decontaminated and personnel were allowed to leave for the week end. The following Monday decontamination work was started and by Wednesday, August 31, the work area had been restored to normal operation.

On Friday, August 13, a Hot Shop technician alarmed the TAN-607 exit portal monitor while leaving for home. Contamination to 20 mr/hr was found on his head, ahdn, chest, trousers, shirt, and socks. Clothing was confiscated and a shower removed contamination. A highly contaminated fuel element can, which had been wrapped and transferred from the Hot Shop Change Room area to

the decontamination area, was suspected as being the source. Area surveys of the technician's normal working area showed floors, chairs, and a desk contaminated to 3500 d/m. The area was readily decontaminated.

SPECIAL PROJECTS

A study is being made of the TSF radioactive liquid waste processing system to determine if the volume of liquid reprocessed by evaporating can be reduced. At present the liquid waste flows through a sand trap into three 10,000 gallon collecting tanks. From these tanks the waste can be directed to either the evaporator or the disposal well. Efforts are underway to see if a filtering system can be positioned at the inlet side of the collecting tanks and before and after samples taken to determine if there is an appreciable reduction in activity. If this activity reduction is sufficient a permanent filtering system could be put into effect thus reducing the cost of waste processing.

can exch?

A modified "may-pack" type filter train for the LOFT fission product sampling system and a filter train consisting of boron nitride and charcoal were subjected to mixed fission products. The fission products were produced by the irradiation of a small fission chamber during recent SNAPTRAN transient tests. The qualitative results obtained were relayed to interested personnel.

Seven AEC Fellowship students spent time at TAN observing HP activities. These activities included touring the TAN-IET area, acquainting themselves with the multi-channel spectrometer, calibrating Tracerlab RAM heads, and measuring the efficiency of the IET inlet air filter bank. A unique method was used to determine the efficiency of the IET filtering system. This method takes advantage of natural radionuclides. By collecting the decay daughters of radon and thoron an in-place filter efficiency test can be made. This method has the advantage over a DOP test in time and costly equipment. A simultaneous air sample is taken upstream and downstream of the filter bank and the collected particulate concentration measured. The filter efficiency can then be expressed as, efficiency $\frac{C_1 - C_2}{C_1} \times 100\%$, where C_1 is the particulate concentration upstream of the filters and C_2 is the downstream concentration. Flow rates, decay times, counter efficiency and air pressure are all taken into consideration. Using this method the efficiency of the IET filtering system was calculated to 97.0% ± 1.2%.

RADIOLOGICAL ENGINEERING

Considerable time was spent discovering the methods used to evaluate the hazards arising from proposed reactor test programs. Extensive literature reviews were conducted to document procedures and assumptions which are acceptable for use in calculating the hazards from the tests. These reviews were made of Quarterly Technical Reports, approved Safety Analysis Reports, published articles and technical reports. Several discussions were held

with the U. S. Weather Bureau, the computer program center, and AEC Health and Safety personnel to aid in learning procedures and philosophy embodied in the safety analysis reports. Limited reviews were made of PBF and LOFT preliminary safety analysis reports. The STEP project was assisted in drafting the final copy of the SNAPTRAN-1 and -2 Safety Analysis Report.

PARTICLE SIZING

Particle sizing instruments that are now at our disposal all lack features which are essential in fulfilling our radioactive aerosol sampling requirements. They are difficult to calibrate, sample at a low flow rate, overload and require time consuming preparations for use. These inherent problems have been discussed and studied by several noted authorities on particle sizing sampling instruments but remain unsolved for these instruments. The English have recently developed an air sampler, the Cascade Centripeter, which has eliminated many of the undersirable features listed above. It operates under the same physical phenomena which is utilized in the Anderson Sampler. Correspondence has been made with the inventors to determine if and when this sampler will be available either in England or the U. S. This sampler could be fabricated within the plant at a cost of approximately $80.00 per sample in lots of six or more. It would cost approximately $300.00 to fabricate just one sampler.

MISCELLANEOUS

From time to time we are contacted by co-workers who are apprehensive about the radiation exposure a member of his family may have received as a series of diagnostic x-rays.

With the increased use of x-rays for medical and industrial purposes and with the public attention that is being focused on radiological damage, it appears that health physicists should be able to give a realistic and professional reply to these inquiries. Without a firm grounding in x-ray exposures and techniques the tendency may be to cite some of the more frightening case histories, or to avoid answering the inquiry by saying the variables are too many to give an adequate answer.

Since the former can lead to increased apprehension and misinformation to the public concerning radiation exposure and the latter can lead to loss of respect from co-workers because we don't know enough about our business to give straight forward answers, it appears that some of our technical seminars should be devoted to acquainting health physicists with the many variables involved in assigning a probable exposure from a series of x-rays.

SUMMARY OF ROUTINE WORK

Smears	2200
Direct reading dosimeters issued	30
Body fluid samples	
Routine	71
Special	0
Liquid samples	
Waste water	4
Radioactive shipments	
Off-site	3
On-site	28
Burial ground	6
Laundry	8
Safe Work Permits	27
Beryllium analysis	0
Safety Meetings	1
Excess exposure requests	0
Whole body analysis	4
Green Tags	191

MAN HOUR TABULATION

EXEMPT	NONEXEMPT	TOTAL		EXEMPT	NONEXEMPT	TOTAL
	Scheduled Hours				Actual Hours Worked	
1408	1936	3344		1251½	1825½	3077
	Overtime				Absences	
2½	44½	47		S - 0	59	59
				SF - 15	0	15
				V - 144	56	200
				O -	40	40
	TOTAL	3391			TOTAL	3391

OLCordes:dc

O L Cordes

cc: J. P. Lyon
M. H. Bartz
W. E. Nyer
R. G. Anderson
F. L. Bentzen
J. R. Fielding
C. M. Hauge
R. E. Hayden
R. K. Ingram
D. K. Jenson
R. B. Johns
L. J. Johnson
B. C. Laney
D. R. Mousseau
R. S. Peterson
N. G. Reece
D. G. Reid
B. F. Savignac
F. Schroeder
A. L. Smith
J. F. Sommers
L. P. Terch
I. J. Wells
T. R. Wilson
TAN-SPERT HP's
O. L. Cordes
File

1156223