UNITED STATES
ATOMIC ENERGY COMMISSION

HANFORD OPERATIONS OFFICE
P. O. BOX 550
RICHLAND, WASHINGTON

IN REPLY
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IMMEDIATE RELEASE

Information Division
Phone 7-8341

Richland, Washington, March 22 - Less than two dozen of the present 9,000 operations force at Hanford Works can recall by actual knowledge the mystery of ten years ago at ground-breaking time when they came on the job to start building something they knew not what.

A decade ago ground was broken for the "hush-hush and rush" wartime project that was to take in 600 square miles of arid lands in Southeastern Washington.

Those who were here then shake their heads when they think back to the days of uncertainty and secrecy that went with their jobs. There was no central working place or living area for that first tiny nucleus of Hanford's present force. Nor was there a place to live on the project.

Some worked in Pasco and lived there. Others had their office and homes in Prosser. Gradually they learned that the federal government, under direction of the powerful Manhattan District of the Army Engineers, was taking over several hundred thousand acres of land, including the villages of Richland, Hanford and White Bluffs. All three were strung along the Columbia River.

E. I. du Pont de Nemours & Company was doing the hiring except

for government personnel.

The word plutonium, which Hanford produces, wasn't even in the vocabulary of those first workers.

Veteran of the 10-year employees is Ned D. Sturgis, of the Atomic Energy Commission's security division, who came on the job February 27, 1943, from the New York Engineers District. He wears security badge No. 6. The five lower badge numbers were worn by military officers who have since gone.

Norman G. Fuller, AEC community division, started work about the same time. His job was to help acquire the land that was needed. His present secretary, Mrs. Lucille Howard, was working with him then in a Prosser office.

Three present employees of General Electric Company, now operating contractor of the project, went on the du Pont payroll March 18 ten years ago. They are Thomas G. LaFollette, employee and public relations department; D. J. Hensley, a captain in security patrol, and W. Scott Carter, engineering department.

Benton A. Durley, Jr., AEC administrative division, was transferred to Hanford ten years ago from Mobile, Alabama, by the U. S. Engineers.

John V. H. Mineah, of the GE community real estate and services department, had been a long-time Prosser resident when he started his 10-year employment at Hanford.

Leavitt G. Karren lived on a farm at White Bluffs that was taken over as part of the project. So he immediately went on the Hanford pay-

roll and now is a GE bus driver.

Among others with ten years of employment are Mrs. Avis Forsyth, manufacturing department, who had lived in Richland since 1939; Mrs. Jane Glode, general accounts; E. S. Bell, Robert G. Kramer and Claude Lynels, all in GE engineering.

John Dam, utilities and general services department, a Richland resident since 1923, occupies the same house he was living in before the atomic plants were built. Another GE employee living in his pre-war farm home is C. J. Barnett of engineering.

Four other project workers who lived in Richland in its village days are Joe E. Millard and R. B. Dighton, both in community public works unit; Lester J. Fishback, manufacturing; and Pete O. Hanson, transportation.

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AEC

UNITED STATES
ATOMIC ENERGY COMMISSION
Washington 25, D. C.

SNAP FACT SHEET

SNAP (Systems for Nuclear Auxiliary Power) is the AEC's program for the development of compact, lightweight, reliable atomic electric devices for space, sea and land uses.

The program includes the development of techniques, materials and equipment required to apply to and advance the technology of atomic auxiliary and propulsive electric power. Under this program, compact atomic-electric power packages (conversion of fission or radioactive-decay heat to electricity) are being developed for use in satellites and space vehicles.

The technologies and resources developed for space power units are also being used in the development of atomic auxiliary power systems for military and civilian land and sea uses. Both radioisotope-powered and reactor-powered systems are under development.*

Development of SNAP Radioisotope Devices

The SNAP radioisotope program has brought forth a whole new technology of the use of radioisotopes as unique sources of compact, long-lived power. The fuel form of the several possible fuel radioisotopes, the advanced energy conversion techniques, the detailed study of generator designs and the radiological safety implications of the uses of these devices all contribute to a significant new technology now available for application to space, as well as to land and sea uses.

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* It may be helpful to keep in mind that the SNAP numbering system uses odd numbers for devices employing radioisotopes (SNAP 1, etc.) and even numbers for devices employing reactors (SNAP 2, etc.)

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In March 1956, the AEC initiated a low level effort with the Nuclear Division of the Martin Company, Baltimore, for the development of a radioisotope-fueled space power unit. After a year of studying the suitability and availability of potential radioisotope fuels -- both waste fission products and, especially, irradiated materials -- cerium-144 was selected for use in the development program. Power plant design specifications of 500 watts electrical for a 60-day mission life were established, and Thompson Products, Cleveland, was chosen under subcontract to the Martin Company to develop mercury turbogenerator equipment. The program was designated SNAP-1, and delivery of the first completed unit was scheduled for September 1959. Subsequently this program was discontinued.

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In addition to the SNAP-1 effort, several subcontracts were let under the basic Martin Company contract to develop advanced thermoelectric and thermionic heat-to-electricity conversion devices that could be used with radioisotope heat sources. This program was designated SNAP-3.

The SNAP-3 program was quick to yield results when the Minnesota Mining and Manufacturing Company delivered a complete thermoelectric generator to the Martin Company in December 1958. The generator was designed to receive polonium 210 fuel capsules to be furnished by AEC's Mound Laboratory, Miamisburg, Ohio. Polonium 210, an alpha-emitter, was used because it was suitable and readily available. The Martin Company assembled and tested the complete generator, and delivered the unit to the Atomic Energy Commission in January 1959. This proof-of-principle demonstration device produced 2.5 watts with a half charge of polonium 210 fuel. It was first introduced to the world by President Eisenhower on January 16, 1959, as the SNAP-3 "atomic battery."

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Four prototype isotopic units fueled with strontium 90, SNAP-7A, B, C and D, are being developed for the Coast Guard and the Navy for use in coast navigational aids and automatic weather stations. SNAP-7A and SNAP-7C are 5-watt systems. The others are 30-watt systems.

SNAP-7A is powering an experimental Coast Guard buoy in Chesapeake Bay, Md. SNAP-7C is powering a Navy automatic weather station in the Antarctic. SNAP-7B will be

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used by the Coast Guard in a land-based navigation light, and SNAP-7D will be used by the Navy in an unmanned floating weather station.

The AEC is also developing a 5-watt, strontium 90-fueled system, designated SNAP-7E to power an experimental navigational beacon for the Navy.

SNAP-7B, D and E will be delivered to the users this summer.

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The AEC is developing SNAP-9A for use in the Navy's operational prototype TRANSIT navigational satellites. SNAP-9A is a plutonium 238-fueled thermoelectric generator with a design lifetime of 5-10 years.

The development of this generator was enhanced by two events in 1961. On June 29, and again on November 15, five-pound, plutonium 238-fueled generators, similar to SNAP-3 type generators, were successfully placed in orbit as power sources in the TRANSIT-4A and -4B satellites respectively. The two events represent the world's first use of nuclear energy in space.

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The AEC is developing SNAP-11 for the National Aeronautics and Space Administration. The generator is intended for use on Project Surveyor, NASA's unmanned soft lunar exploration program. SNAP-11 will be fueled with curium 242, will weigh about 30 pounds and will provide a minimum of 18.6 watts of power continuously for 90-day lunar missions.

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SNAP-13 is a low-powered cesium-vapor thermionic generator being developed to demonstrate the feasibility of using a radioisotope heat source in such an energy conversion device. The generator will be designed in line with the SURVEYOR power requirement and is expected to be developed into an alternate unit for SNAP-11. Tests will be conducted on an electrically heated unit in FY 1962. A fueled SNAP-13 will be completed in FY 1963. Work on an improved thermionic unit will extend through FY 1964.

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Development of SNAP Reactors

In the fall of 1955, the AEC asked industry to bid on the development of a space reactor system for the Air Force. A concept by the Atomics International, Canoga Park, California, was chosen in the spring of 1956 and was designated the SNAP-2 program.

The SNAP-2 program for developing a three electrical kilowatt unit has progressed to the point of testing a prototype reactor core at design power and temperature conditions in a special test facility. Mercury vapor turbogenerator conversion equipment is being developed by Thompson-Ramo-Woolridge, Inc., Cleveland, under contract to Atomics International.

An atomic-electric power system that must start up automatically and operate unattended for a long period of time in space must have a completely automatic control system. Insuring the high quality of performance required will be possible only through the conduct of ground tests. The tests for SNAP-2 are to be conducted in an especially constructed $3 million facility called the SNAP Environmental Test Facility (SETF) at Santa Susana, California, completed in 1960. Design of this facility permits flexibility in testing fully automatic SNAP-2 systems. Provision is made for remote manipulations and for removal of all radioactive components, including the reactor fuel elements. Flight tests are planned for 1965.

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Until January 1959, the three electrical kilowatt SNAP-2 unit was the only space atomic reactor auxiliary power system under development by the Atomic Energy Commission. Since that time, two additional space power unit development programs have been started based on the metal hydride reactor technology developed under SNAP-2 -- SNAP-8 to develop a 30 electrical kilowatt propulsive power unit and SNAP-10A to develop a 500 electrical watt atomic auxiliary power unit.

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The SNAP-4 project began in 1959 as a feasibility study on the development of a very compact reactor-turboelectric system with the capability of long unattended life in an underwater or remote land location. Design study and component development began in 1960 for this experimental reactor. The reactor is to use SNAP-2 hydride fuel technology

and boiling water as a coolant in a single-loop system. The project would require the development of compact turboelectric generators capable of generating 1,000-4,000 electrical kilowatts.

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SNAP-8 is being developed in conjunction with the National Aeronautics and Space Administration. NASA is developing the power conversion equipment and will accomplish the over-all system integration. The NASA contractor for this program is Aerojet-General Corporation, Azusa, California. The SNAP-8 program schedule includes the demonstration of a 90-day system life in 1964, and a demonstration of the operation for 10,000 hours of a complete system in 1965.

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Conceptual design of a conduction-cooled 330-pound, 300 electrical watt reactor system using thermoelectric conversion was completed in 1959 under a program designated SNAP-10. In 1960 the program was redirected to develop a more powerful convection-cooled system using the SNAP-2 reactor. This unit, designated SNAP-10A, will be capable of producing 500 watts at a system weight of about 750 pounds. SNAP-10A will be tested in an Air Force satellite program. This program is aimed at flight demonstration in 1963.

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The largest electrical power system for space application presently being studied is SNAP-50, with a power rating of up to 1,000 kilowatts and beyond. Successful use of electric propulsion in deep space missions, as well as really advanced space vehicles and satellites, will require these high power levels. This SNAP-50 system represents a more long-range program than those of SNAP-2, 8, and 10A, since the higher power levels require the development of an advanced reactor technology beyond that used in the other reactor systems.

Safety Considerations

Plutonium 238 was selected as the fuel for the first SNAP space missions for two basic reasons: (1) it is primarily an "alpha" emitter (the least penetrating of the three types of radiation) so that the generator requires no shielding at all

(most of the energy of the alpha particles is used to produce heat within the device); and (2) its relatively long half-life offers maximum advantage over other types of power supplies (the polonium 210 used in the SNAP-3 has a half-life of less than five months, so that its power output dropped off rapidly).

Isotopes with very long half-lives do not have a sufficient concentration of alpha-emitting radioactivity to make them practical for lightweight isotopic power sources.

Plutonium 238 is identical chemically to other isotopes of plutonium but its nuclear characteristics are quite different. For example, plutonium 238 cannot support a chain reaction. Even in large masses it presents no danger of atomic explosion. However, all forms of plutonium are poisonous if inhaled or ingested by living organisms.

Description of SNAP Safety Tests

The plutonium 238 fuel capsule for the SNAP device is designed to survive safely launch pad accidents, including fire and explosion; to withstand impact; and to burn up in the atmosphere when it ultimately re-enters from orbit. Various realistic tests have been run to prove out the adequacy of the design features.

Studies of launch pad aborts show that if a fire results, the oxidizer from the booster will vaporize quickly, but a generator located in the wreckage could be subjected to the fire for about 15 minutes. A simulated missile fire test has been conducted in connection with the SNAP generator program at Aberdeen Proving Ground, Maryland. In this test, 8,500 pounds of kerosene and 6,000 pounds of aniline and nitric acid were ignited over a simulated missile structure which held 5 generator assemblies. Initial flash temperature reached 5,100° F. Temperatures varying from 1,200° F. to 2,600° F. were recorded over a 15-minute period. All fuel capsules were retained in the generators and no detrimental effects on the fuel capsule were noted.

An explosion test using 1,650 pounds of TNT subjected SNAP generators and isotope containers to a shock pressure of 1,000 pounds per square inch. The core material was Haynes-25 alloy but similar cores were also constructed from graded aluminum for use in this test. Even the lowest grade aluminum core maintained its mechanical integrity.

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To test the ability of the plutonium 238-fueled SNAP generator to contain its radioisotope fuel if it should fall back to earth at maximum velocity after a launching failure, two complete generators and one bare fuel capsule were impacted at maximum velocity against a granite target. The single bare capsule was preheated in a furnace before impact. The capsules suffered some deformation in this test but did not fracture. A capsule from one of the generators was pressure-tested to 10,000 pounds per square inch after impact to further test its integrity.

Scale models of the complete generator and the fuel core were tested in plasma-arc tunnels at the General Electric Aeroscience Laboratory, Philadelphia, to substantiate that on re-entry from space the generator and fuel core will burn up to very fine particles which will be dispersed harmlessly in the stratosphere.

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6/15/62

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ADVANCE RELEASE: FOR MONDAY A.M.'s, MARCH 30, 1959

USIA REPORTS PROGRESS IN GETTING THROUGH TO SOVIETS

Four developments are opening ways for getting more information about America to people in the Soviet orbit, according to the U.S. Information Agency's eleventh semiannual report to Congress which was released today by USIA Director George V. Allen.

Allen listed these developments as:

(1) Improved Voice of America radio signals to Eastern Europe, achieved by rescheduling broadcasts to concentrate transmitter power and thus combat jamming.

(2) Wider readership in the USSR of USIA's Russian-language magazine, America Illustrated, and shipment of more than $1 million worth of publications and motion pictures to Polish importers.

(3) Scheduling for this summer of the American National Exhibition in Moscow, the first official U.S. exhibition ever to be held in the USSR.

(4) Agreement for the showing of U.S. motion pictures in the Soviet Union which will give the Russian people their first chance in 20 years to see some modern American-made feature and documentary films.

"We are proceeding on the assumption," Allen said, "that the Russian people, like all other human beings, want to think for themselves and that, whenever possible, they will insist on it."

Allen noted that in the last half of 1958, USIA staffs overseas were called on to give special attention to the Berlin question, Middle East problems, trouble in the Taiwan Straits and difficulties in Latin America.

"Our information efforts were designed to assure the people of other countries not only that the U.S. is determined and able to assist the free world to resist armed aggression," Allen said, "but also that we are ready to seize any reasonable opportunity to negotiate a peaceful settlement of outstanding disputes."

During the six-month period, the USIA report said, work was completed on a teletype network linking Washington to 75 USIA posts abroad; new libraries

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and cultural centers were opened, and plans were made to increase and improve the teaching of English -- fast becoming a world language.

More than 130,000 persons overseas studied the English language in 165 USIA-sponsored cultural centers and language institutes. In addition, about 4,500 local teachers of English -- whose students number about 1,000,000 -- attended USIA English-teaching seminars during the six months. The USIA center in Tehran, Iran, alone had an enrollment of 5,000 students. In Taipei, USIA English lessons by radio, broadcast through the Free Chinese network, had so many listeners that the demand for printed tests could not be met. In Mexico a 6 p.m. USIA-sponsored English teaching program on television earned the highest audience rating for that hour in Mexican TV history.

In its first month of operation, October, 1958, USIA's new information center in Marrakech, Morocco, had 13,000 visitors. Students and other residen continued to come in such numbers that the center had to issue colored cards, a different color for each day, restricting the use of the center to one day a week per member.

At the close of 1958, the Agency was operating 155 USIA libraries in American cultural centers overseas and was aiding the operation of libraries, educational classes and other activities at 92 binational cultural centers.

The increasing interest of individual Americans and American organizations in people and groups abroad was termed of great value to the Agency's work. As part of the People-to-People program, for example, about 105,000 books were sent overseas. Seventy American communities, affiliated with foreign cities, exchanged musical salutes, delegations, lectures, exhibits and other cultural material.

Wide acclaim was given the Voice of America's world-wide salute to Irving Berlin on his 70th birthday, in which President Eisenhower took part.

About one-fourth of the Agency's daily wireless press reports during the six months was devoted to science feature material, much of it concerning International Geophysical Year news. The story of U.S. science and technology was told in the context that their high level had been an achievement of the free, democratic system, designed to bring great and varied benefits to men everywhere.

In November the Agency set up a separate television service to provide overseas posts with programs on American life for viewing on the 20 million TV sets in use in the free world outside the U.S. and Canada.

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S-59-62
6/27/62

ORBITING NUCLEAR GENERATOR ESTABLISHES MILESTONE IN ATOMIC AGE AFTER FIRST YEAR OF SUCCESSFUL OPERATION

Friday, June 29, 1962, marks the first anniversary of the world's first use of nuclear power in space. Attached is an announcement for release on that date, together with a statement by Atomic Energy Commission Chairman Seaborg. Also for your information is a Fact Sheet on the nuclear energy POWER program.

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INFORMATION DIVISION
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Richland, Washington, June 29, 1962 --

ORBITING NUCLEAR GENERATOR ESTABLISHES MILESTONE IN ATOMIC AGE AFTER FIRST YEAR OF SUCCESSFUL OPERATION

The atomic age is observing a milestone today -- the first anniversary of the world's first use of nuclear power in space.

The source of this power is a five-pound "atomic battery" -- the first to be used in a space satellite.

The experimental nuclear device, developed by the Atomic Energy Commission, continues to operate successfully after a year of orbiting the earth. It is generating electricity for two of the four navigational transmitters of the Transit-4A Satellite launched June 29, 1961, at Cape Canaveral in a flight test.

The device is a small, lightweight thermoelectric generator fueled with plutonium 238. It is approximately 5 inches in diameter and 5½ inches high -- about the size and shape of a grapefruit -- weighs 4.6 pounds and generates 2.7 watts of electrical power. (Solar cells are providing the power for the other two navigational transmitters.)

The nuclear generator is instrumented so that its performance in space can be monitored by transit tracking stations. At the end of its first year of operation, the generator has produced 23,650 watt hours of electrical energy, the equivalent of the energy from about 2,000 pounds of storage batteries.

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The satellite is circling the earth every 104 minutes in a 67 degree orbit. The log at the end of the first year of operation shows about 142,000,000 miles in 5,000 orbits. The satellite whirls 540 - 620 miles about the earth.

The generator was developed for the Atomic Energy Commission by the nuclear division of the Martin Company, Baltimore. The thermo-electric assembly was developed by the Minnesota Mining and Manufacturing Company, St. Paul. The plutonium fuel was produced at the AEC's Savannah River Plant, Aiken, S. C., and Hanford (Washington) Works, and was loaded in a rugged capsule by the AEC's Mound Laboratory, Miamisburg, Ohio, operated by the Monsanto Chemical Company.

The plutonium-fueled capsule is located in the center of the sphere. Because the plutonium has a "half-life" of about 90 years (i.e., its radioactivity, and therefore its heat generating capability, will drop by only 50 per cent during that period), the generator has the potential for powering a space transmitter for decades.

In the generator, the spontaneous decay of the plutonium 238 generates heat in itself and is transferred to the containment block surrounding it. Thermocouples convert some of this heat directly into useful electrical energy. The generator has no moving parts.

The operating data is being relayed by the tracking stations to the Johns Hopkins Applied Physics Laboratory, Howard County, Maryland, which developed the satellite, one of a series, for the Navy's Bureau of Naval Weapons.

The nuclear generator was developed in the Commission's Systems for Nuclear Auxiliary Power (SNAP) Program. Aim of the program is the development of compact, lightweight, reliable nuclear electric devices for spacecraft and other uses.

Statement by Chairman Seaborg on the occasion of the first anniversary of the world's first use of nuclear power in space:

"Our nation is observing a most significant milestone -- the first anniversary of the world's first use of nuclear power in space. The source of this power -- a tiny five-pound atomic "battery" developed by the Atomic Energy Commission -- is orbiting the earth on a Navy navigational satellite. The device is powering instruments which are transmitting data back to earth -- doing the job which at one time would have required thousands of pounds of batteries.

The use of nuclear energy in space is comparatively new. Its development has been accelerated by the need for lightweight, compact power sources to operated over long periods of time.

The atom is already providing electric power for thousands of homes. It has gone to sea and to remote areas of the world to provide man with new dimensions. Now the atom is demonstrating that it can broaden our horizons beyond the earth.

I firmly believe that nuclear energy provides the most feasible means of accomplishing long voyages in space and many other ambitious missions of our national space program. The Atomic Energy Commission is working with several government agencies on ways to make this possible.

We are developing, for example, a power source in support of a mission to explore the surface of the moon. There is also the fascinating prospect that nuclear-powered generators can be used in a series of satellites to provide a world-wide television network. And perhaps one day there will be a nuclear-propelled manned spacecraft spiralling out from earth on its way to Mars.

Because of the exciting panorama of applications, the development of nuclear energy for space is most important. Mankind is only on the verge of the space age. Nuclear power will take us into this age -- and close to the planets."

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Note: This release is being issued simultaneously by AEC Headquarters, Washington, D.C.

UNITED STATES
ATOMIC ENERGY COMMISSION
HANFORD OPERATIONS OFFICE
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RICHLAND, WASHINGTON

IN REPLY REFER TO:
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IMMEDIATE RELEASE

INFORMATION DIVISION
PHONE WH. 2-1111, Ext. 6-4933

Richland, Washington, August 10, 1962 -- Raymond J. Britton, Richland, Wn., has been awarded an $86,200 contract, with notice to proceed, by the Atomic Energy Commission for construction of a cesium loadout facility, a waste crib, and related work at Hanford Works.

Work includes a building about 26' x 32' with concrete structure for the loading facility. The waste crib will be approximately 32.5' long by 5' wide.

The contractor will have 120 days to complete the cesium loadout facility and 45 days to complete the waste crib.

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