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SC #09430/63-KH
FID/AECB 136/63
29 August 1963
Copy # 4

MEMORANDUM FOR: Chief, Atomic/Biological/Chemical Division, OSI

ATTENTION:

FROM: Chief, CIA/FID(WFIC)

SUBJECT: Search for Uranium Mining Activity,
Cau-haien, China Area

REFERENCES: Requirement No. OSI/R-114/63
CIA Project No. C 411-63

1. In accordance with the above requirement aerial photography taken of the greater Cau-haien region, China, since [redacted] was searched for the purpose of locating uranium mine or mines and will presently believed to be in operation.

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Chekkiang region. [] has evaluated the fluorite vein deposits of the central Chekkiang region. [] He concludes that fluorite vein discoveries are possible over a wide area of Chekkiang. He describes the deposits as veins generally 100 meters or so in length (300 feet) and ranging up to 2 to 3 meters in thickness (6 to 9 feet). Fluorite varies greatly in color but usually is a dark green or dark bluish purple where associated with uranium minerals. The 1959 photography of the three open pits shows each of them to be of the order of two to three hundred feet in length and with linear piles of rock or ore along the benches of the open pits. Pending further information these open pits are considered to be fluorite diggings. If there are uranium-bearing ores in the Chu-chia region, this mine is suggested as the source of a small output as a by-product of fluorite mining, pending the receipt of better and more up-to-date photography.

4. The Ch'ang-shan possible fluorite mining district as seen on [] photography, []

[] magnified about forty times, has been much expanded since 1959. Incidentally, it should be noted that a chemical plant east of Lung-yu, 30 km east of the mine, is undergoing a several-fold enlargements, possibly to treat the concentrates from this mine. Neither the enlarged mine nor the enlarged plant had commenced production in mid-1961. The summit of the hill is being cut down by two or more benches to the lower level of two equi-sized benches, the eastern bench for mining and the western bench essentially for servicing the mine. Each bench has its own headquarters, plant, and service buildings. There is a possible power house located midway between the benches and at the entrance of the service road. Southward from the benches and running down into the valley there is a drilling face which may be for the purpose of testing the valley alluvial floor for the construction of a tailings retaining dam or also for prospecting for a faulted ore body. A possible aerial ropeway road, as seen southward from the service bench over the service road to the north side of the town of Chu-chia. Here on the east bank of the Ch'ang-shan Ch'ang River and the north side of Chu-chia at 20-25 N 113-45 E is to be seen a small artificial river basin where goods could be transferred to shallow-draft river boats. The down-stream orientation of the basin seems to indicate that most of the traffic is expected to be down the river in the direction of the chemical plant just east of Lung-yu. It is thought the ore may be brought by river boat to the mouth of the Hsun-Ch'i River whence they are transhipped by truck through the town of Lung-yu to the west plant gate.

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5. One and one-half km northeast of Lung-yu and 18 km SSE of Chu-hsien alongside the Chu-hsien-Chin Hua Railway, is a road-serve plant at 29-04N 119-11E, which is identified as a possible combination fluorite mill and a hydrofluoric acid plant. This plant is best seen on mission [redacted]

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The old plant is being enlarged and appeared to be inactive at the time of the photography. The radius security, the absence of extensive dumps, and the apparent small amount of acid storage (3 small tanks are visible) may indicate that small quantities of hand sorted high grade uranium minerals could be treated at the plant on a limited by-product basis. An old and a new elaborate system of water purification basins and tanks indicate the presence of poisonous elements, possibly fluorine, uranium, etc. During the course of searching for areas indicating prospecting activities east of Chu-hsien, it was determined that this plant is situated in the center of a region of scattered mines, some of which possibly are fluorite mines, which may produce small quantities of uranium on a by-product basis. A brick plant, a possible foundry, and a machine shop adjoin the plant on the west; their support being required to maintain the equipment processing the highly corrosive hydrofluoric acid. Adjoining the unsorted coal piles about an old boiler house are neatly stacked piles of a black mineral, which also is piled against a possible grinding plant, and may possibly, in part, represent lump dark fluorite awaiting processing while the plant is being enlarged.

6. G. Elnacke in a later description 3/ claims that there are fluorite deposits and mines along the Chekiang-Kiangai Railway in the Chin-hu, Lan-shi, and Chai regions among others. A search was conducted of photography from [redacted]

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[redacted] of the Lan-shi and Chin-hu regions for the location of possible fluorite mines, as claimed by Elnacke, and also to consider the possibility of their supplying a tentatively identified centrally located fluorite mill and hydrofluoric acid plant east of Lung-yu. The mines are located at 29-13N 119-37E and 29-59N 119-43E and two possible mines are at 29-16N 119-36E and 29-05N 119-51E. No study of these mines was made. If the mineralogy of their ores is similar to those of the possible fluorite mine north of Ch'ao-chin, described in paragraphs 3 and 4, they too may make some contribution to the uranium-bearing concentrates processed in the Chu-hsien region.

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7. Perhaps, pending the receipt of later collateral information or better reconnaissance photography, the production of U_3O_8 equivalent might be very roughly estimated at fifty tons per year for the Chu-hsien region on a by-product basis.* Inasmuch as there is a considerable supply of black ore already accumulated the production of the first year or so may run higher than the average annual output for the plant. It should be remembered always that not all dark or purplish fluorite is highly or commercially radioactive, and this could be true in the Chu-hsien region. Since both the mines and the plant are under construction there seems no way to verify photographically if the dark ores are radioactive.

8. The tracker camera (1) of mission [REDACTED] shows on very small scale but fair quality photography, a possibly road served mining district at 29-00N 119-22E. Details regarding this district, as seen when magnified about fifteen times, are on file in the ABC Branch, where they may be consulted.

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* This estimate is based on the 1960 production of the two French pitchblende-fluorite producing districts in Saône-et-Loire and Vendée which together produced 19,261 metric tons of ore containing 20.7 metric tons of U_3O_8 equivalent or an average of .012 percent U_3O_8 equivalent per ton of ore. (France, Bur. Documentation Minière Statistique de l'Industrie Minière, 1960, Paris, 1961). These are deposits and their ores have been described in detail by J. Cettrey & J.A. Sarcis, "Les Minerais Uranifères Français. I. Les Minerais Noirs," Paris, 1960, p. 38, 63, 70 & by H. Roubaud, "Les Minerais Uranifères Français et leurs Gisements," Paris, 1961, p. 19-37, 395-399. Presumably these ores of Saône-et-Loire and Vendée France may resemble those of the Chu-hsien region, China, in many aspects. The photographs accompanying the latter book show mine headframes and supporting buildings which appear similar to those seen at the Ch'ang-shan mine.

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9. It is further suggested that the Ch'u-chiang River has carried away (eroded) the light toned sedimentary deposits which were once continuous from the possible mining district at 29-00N 119-22E northward to the foothills village of Tu-tse-chen, 29-07N 118-56E, to which a message was sent, possibly in 1961. 4/ Thus it is only logical that deposits be prospected on the north side of the Ch'u-chiang River which were lithologically similar to a possible mineralized area noted in the preceding paragraph on the south side. The region around the village of Tu-tse-chen was scrutinized on fair quality but for oblique photography of mission [redacted] tracker camera [redacted] but no mining could be observed. Likewise mission [redacted] continues to show no mining. Scattered to heavy clouds on poor quality for oblique photography obscure partially the western side of the Tu-tse-chen area.

10. A careful search was made for evidences of prospecting in the west greater Chu-hsien region on cloud free [redacted] photography, mission [redacted]

[redacted] which has some scattered clouds in the eastern greater Chu-hsien region. Large scale photography of all of the greater Chu-hsien region is unavailable. The small scale photography cited above shows four separate areas where the characteristic grid pattern of drilling, trenching, or pitting can be observed. The prospected areas cover extensive several hundreds of acres and appear to be of interest in the search for mineral deposits of considerable extent, possibly for coal or iron or copper ores rather than uranium ore. Their chart showing the locations of the prospected areas and the descriptions of these areas are on file in AECB, where they may be examined. Only one prospected area at 28-55N 118-25E shows any mining in progress -- the small black piles of tailings from a shallow underground mine. None of the prospected areas appear to be directly serviced by support buildings.

11. Several sketches and detailed descriptions of several of the above sites are available in AECB Branch files for further consultation is desired.

12. The following materials were utilized in work performed on this project:

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Charts

ACIC. GWS 493, Scale 1:1,000,000, Apr 59, CONFIDENTIAL
ACIC. S 0493-204, Scale 1:200,000, Jun 59, SECRET

Documents

- 1/ Yeh, S.S., and Chiang, Y. Geological Map of Gu-shien, Southwestern Chekiang, Scale, 1:1,000,000, 1930, in Geology of the Coal Fields of Southwestern Chekiang, Geol. Surv. China & Kwangsi, Annual Rept. for 1929-30, see also p. 15, 26, 1930, UNCL.
- 2/ Juan, V.C. Mineral Resources of China. Economic Geology, V. 41, No. 4, Pt. 2, p. 459, Jun-Jul 1946, UNCL.
- 3/ Einscke, G. Die Fluorid-Ab Lagerstätten der Welt (Fluorite Deposits of the World). p. 326, Beispielen, 1955, UNCL.
- 4/ USAF, SWSHM 63-11, 19 Jul 63, p. 5-6, TOP SECRET

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13. The photo analyst on this project is [redacted] He may be contacted on extension [redacted] should you have further questions regarding this project. This memorandum and enclosures complete the referenced requirement.

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Enclosure:

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