

OFFICE MEMORANDUM

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H. E. Ballance

DATE December 9, 1971

J. F. Baytos

ANALYSIS OF SOIL SAMPLES FOR RESIDUAL EXPLOSIVES FROM DRAINAGE DITCHES AT SUMP EFFLUENT OUTLETS

GMX-3

Reference: Memorandum to H. E. Ballance from J. F. Baytos, dated December 21, 1970, same subject

The soil samples taken from the drainage ditches at the sump effluent outlets of Group GMX-3 operating buildings by the Sump Inspection Subcommittee during the annual inspection on November 5, 1971, were analyzed for residual explosives content. The results are presented in Table 1.

The data from the Building TA-16-260 drainage ditch shows relatively the same values as reported previously. The values would not necessarily be the same even though we tried to sample in the same places as previously. The sampling is very dependent on where in the ditch the sample was taken, how deep the shovel was thrust, and how much erosion and alluvium has taken place in the ditch since the last sampling.

Data for the remaining buildings show less than 0.5% total explosive at each sample location. Because of contamination of road, machine, and natural oils which masked the ultraviolet spectrophotometric analysis, the TNT was determined by gas liquid chromatography (GLC). The TNT content is not detectable.

In summary, no large changes in the residual explosives content in the drainage ditch soil compared to previous samplings was seen.

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TA-16

TABLE 1
ANALYSIS OF SOIL SAMPLES FOR RESIDUAL EXPLOSIVES
FROM SUMP EFFLUENT OUTLET DRAINAGE DITCHES AT GROUP GMX-3 OPERATING BUILDINGS

<u>Sample Description</u>	Acetone ^a Solubles <u>(w/o)</u>	CCl ₄ ^b Insolubles <u>(w/o)</u>	CCl ₄ ^c Solubles <u>(w/o)</u>	HMX/ ^d RDX <u>(w/o)</u>	TNT ^e <u>(w/o)</u>	Total Explosives <u>(w/o)</u>
260-1 ten feet from concrete effluent outlet	3.4	3.0	0.4	2.9 ^f	0.0	2.9
260-2 inlet to pond (50 ft from outfall)	12.4	11.6	0.7	10.8 ^g	0.0	10.8
260-3 ten feet above dam in pond (about 70 ft from outfall)	29.1	26.3	2.1	25.7 ^h	0.0	25.7
260-4 ten feet below dam	17.7 25.8	23.6	2.0	22.5 ^g	0.0	22.5
301-5 at effluent outlet	13.9 0.7	0.2	0.2	0.1 ⁱ	0.04	0.1
307-6 at effluent outlet	0.9	0.8	0.1	0.4 ^g	0.0	0.4
342-7 at effluent outlet	1.9	0.2	1.7	0.1 ^g	0.0	0.1

^aThe filtrate comes from the acetone Soxhlet extract on a dried, crushed, 14-mesh sieved, rolled, and quartered sample. This filtrate includes explosives, decomposition products, plastic, lubrication oils, and other natural acetone-soluble materials.

^bThe residue from the CCl₄ wash includes the RDX and HMX fractions and other decomposition products from the acetone extract.

^cThe filtrate from the CCl₄ wash includes the TNT fraction and other soluble products.

^dThese values were determined on the PE 350 ultraviolet spectrophotometer.

^eThese values were determined by gas-liquid chromatography to get around the masking of oil contaminants.

^fThe shape of the HMX/RDX curves shows that the ratio of HMX/RDX is 97/3,

^g95/5,

^h92/8, and

ⁱ20/80.