M E M O R A N D U M

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DATE : June 5, 1997

SUBJECT: **CORRECTIVE ACTION AT HUGHES MISSILE SYSTEMS GROUP, CANOGA PARK FACILITY EPA ID NUMBER CAD 041 162 124**

This is a revision of a December 20, 1996, memorandum by the Geological Services Unit (GSU) staff on Corrective Action at Hughes Missile System Group (HMSG) to include recommendations concerning radiological sampling of monitoring wells. A tentative outline of Solid Waste Management Units (SWMUs) and Areas of Concern (AOCs) currently under consideration and discussion by the GSU was presented in a February 28, 1995 memo. That review was not exhaustive and was based on the then-existing data and information provided by HMSG from its files on environmental investigations at the site. Additional data has been collected by HMSG during a soil gas survey of a number of areas on the site, a site-walk-through was performed with GSU staff, and further groundwater monitoring and cleanup data has become available. This review takes into account the more recent data but does not include a review of the on-going groundwater extraction program. Neither does this review treat the data probably available from L.A. County Sanitation Districts, L.A. City Building and Safety, L.A. City Fire Department, etc., all of which generally contain data necessary for assessing SWMUs and AOCs. Instead, a RCRA Facility Assessment (RFA) should be prepared which includes a records evaluation of HMSG and prior owner/operators. The 1992 Preliminary Assessment (PA) prepared by Ecology and Environment, Inc. for the U.S. EPA is entirely inadequate for purposes of fully evaluating the SWMUs and AOCs because it lacks satisfactory and thorough research and review of available records and data.

EVALUATION

- As indicated in the October 11, 1994, GSU memo, Buildings 272 and 282, previously used for hazardous waste storage of unreported volume and constituents, appear to have been the source of serious solvent contamination of underlying and adjoining soils and is considered by the GSU to be a SWMU or SWMUs where remediation is clearly necessary. The Potential Source Area Investigation Report (PSAIR) prepared by HMSG's consultant, McLaren/Hart described operations at Building 272 as reportedly including solvent cleaning using dichloromethane (methylene chloride). Solvent waste storage apparently included trichloroethene (TCE) from 1989 to present as cited in Table 2 of the PSAIR. The existing limited soil gas survey provides recognition of waste discharge to ground at these buildings. Despite the PSAIR conclusion that "..there do not appear to be significant contamination sources within building 282.", GSU staff noted that drums were stored around its periphery as recently as 1994, and that steam-cleaning operations had apparently been conducted adjacent to it. Furthermore, the 40-gallon tank T-17, used to store hydraulic oil, was previously excavated from the floor of this building. Moreover, the "Phase I Environmental Report of Potential Chemical Release to Soil and Groundwater, Hughes Missile Systems Company, Canoga Park" (ERPCRS), prepared by Groundwater Technology, Inc. (GTI) in 1993, indicated that drum storage had been observed to the east of Building 272 in aerial photographs of 1965 vintage. This was before Building 282 had been constructed in that general location (cited as "sometime after 1986" in the PSAIR). It may be that Building 282 was constructed atop this former drum storage area. Observations made during the walk-through indicates that cracks existed in the concrete floor upon which solvent and waste storage had occurred.

  Although further evaluation is necessary, HMSG may be able to demonstrate that the proposed groundwater sparging system approved for implementation by the Los Angeles Regional Water Quality Control Board (LARWQCB) will or can be modified to accommodate remediation of these SWMU(s) as well as the groundwater problems.

  At present, HMSG has not demonstrated that the remediation system cited in GTI's May 15, 1995, letter, "... will fully address solvent or TPH present in soil and groundwater." Further assessment was proposed to depend on efficacy of remediation. GTI's statement in this letter that "... no further assessment in this area would be required." is in fact misleading. Since HMSG did not want to perform soil gas work at the building at the time of the multi-depth soil

gas survey (July 6, 1995) report by Environmental Support Technologies (EST), the extent of problem in this area has not been fully determined. This may ultimately be acceptable, provided that HMSG actually demonstrates that, as part of the on-going air sparging cleanup of ground water, the contaminated soil at these two buildings is really being cleaned up. Moreover, soil clean-up goals need to be determined and an adequate monitoring and verification program for the soil contamination at Buildings 272 and 282 must be provided to demonstrate achievement of those goals. It is suggested that the Hazardous Waste Management Unit (HWMU) closure performance standards be utilized for the sake of consistency.

Since the on-going work in this area is probably removing VOC contamination in the soils associated with Buildings 272 and 282 together with contaminants induced from dissolved to vapor phase by the on-going groundwater sparging, the existing process should be memorialized as a RCRA corrective action Interim Measure (IM). HMSG must still provide performance measures that demonstrate the effectiveness of the system to deal with VOC-contaminated soil issue at Buildings 272 and 282. Therefore, despite GTI's representations to the contrary, these buildings require significant attention with respect to corrective action --- even though HMSG may fortunately already have the long-term corrective measure in place. Most especially, corrective action effectiveness for these SWMUs must be demonstrated.

- Specific portions of Building 262 were excluded from further consideration in the PSAIR by Mclaren Hart on the basis that a single visual inspection, at one specific point in time during site operation in 1989, failed to note any spills, etc., on the floors of these areas. However, at the same time the PSAIR indicated that there had been a long history of usage. Such usage apparently included as of 1989, some 500 gallons/year of dichloromethane (methylene chloride) but also included 1,1,1-trichloroethane (TCA). Although this building is situated near-field upgradient to monitoring well MW-24, which has not shown contamination, it is also upgradient from wells CM-8d, CM-9d and CM-18, which have all exhibited 1,1-dichloroethene (1,1-DCE) for which no source(s) have been defined yet.

  During the site walk-through by GSU staff, it was indicated by the escorting HMSG personnel that at least during HMSG tenure, solvent use in this building appeared to be confined to a second floor laboratory. However, building drain line(s) from the laboratory to below-grade "feeder" sewer lines probably exist(ed). Solvent waste from the laboratories could have been conveyed by the building drains

to the "feeder" sewer lines beneath the building where leakage could have occurred. Despite this possibility, GTI indicates that there is a "... lack of an identified potential entry path to soil and groundwater." The GSU staff strongly disagrees since building drains and "feeder" sewer line(s) under the building are clearly identifiable as a potential pathway. The GSU's concern with such a pathway is that renewed use of the building plumbing by any new occupants could renew transport from hypothetical residual concentrations of contamination in the soil zone(s) around the "feeder" sewer line(s). Therefore, this building should remain an AOC until a source for the contamination in well CM-8d is demonstrated.

Note that the June 28, 1996 groundwater monitoring report shows that contaminant concentrations in well CM-8d increased significantly. It was not recommended at the time of the walk-through that the site investigation proposed at that time include soil gas work or borings underneath this building. It was hoped that another source would be demonstrated by the proposed work. It was not and it is clear that further evaluation is necessary to document usage of past owners to assure that solvent use was always restricted to the upper floors, to determine where building drain lines connect to below-grade "feeder" sewer line(s) beneath the building, to document what building modifications may have been made through time, and to assess whether portions of the main site-wide sewer system exist under or adjacent to the building, etc. It is clearly necessary under RCRA corrective action to determine a source for the contamination exhibited in wells CM-8d, CM-9d and CM-18 and to assure that no further contamination will be discharged to ground water. Therefore, potential corrective action related to Building 262 should include continued groundwater monitoring of existing wells, installation of additional wells or performing "hydro-punch" operations to isolate the source. If the foregoing isolate the contaminant source at Building 262, then a soil gas survey of the main and "feeder" sewer lines at or beneath the building would be necessary. Alternatively, a combination of hydro-punch and soil gas work might be used to "clear" the building. If during the RFI, this building is determined to be a source of the observed groundwater contamination, through a potential path such as "feeder" sewer-line leakage, direct investigation and remediation could become necessary to preclude further discharge.

- Building 263 contained spray paint operations prior to 1987, had a degreaser, and apparently utilized solvents in Boiler Room cleaning activities until HMSG operations ceased. It is located relatively near-field and upgradient of

monitoring well CM-8d. This monitoring well has exhibited concentrations of dichloroethene (1,1-DCE) as high as 760 µg/l. Although the only chemical cited in Table 2 of the PSAIR for this location is dichloromethane (methylene chloride), nothing in the PSAIR, such as the visual inspection report by the HMSG consultant, indicates that this building could not be a potential source for the contamination observed at monitoring well CM-8d.

As GTI stated, "... the source of the VOCs in well CM-8d has not been established", however, their conclusion that "[N]o further investigation of the building itself is required." is not necessarily accurate. Despite the multi-story nature of the building, sinks / floor drains, etc., all typically lead somewhere --- for instance to "feeder" sewer lines beneath this building which then lead to the main site-wide sewer line outside. It was observed during the GSU walk-through that there appeared to be a sump or floor drain in one of the separate rooms, and a trench drain of some kind in one open area on the first floor, etc. Therefore, an examination of detailed floor plan(s) of this building needs to be performed, which should concentrate on potential pathways or sources, such as connections between the building drains and the "feeder" sewer lines, etc., before it can be reasonably concluded that investigation of the soil beneath the building might not be needed.

The EST soil gas investigation covered locations along the west side and southeast corner of the building ["Areas 3 and 4" of the GTI report, respectively]. Neither set of samples were directly at or underneath Building 263 proper. Samples SG-29 and SG-30, were obtained 40-50 feet to the west and SG-45 was obtained 20-30 feet away to the southeast. Despite all of these samples being non-detect (ND), Building 263 is not fully cleared with regard to any responsibility for groundwater contamination found to the southeast at well CM-8d, since investigation has not been performed under the building. It can only be concluded that there is no laterally extensive vapor-phase soil contamination in the vicinity of the building. The source for contamination at well CM-8d needs to be discovered before this building is removed from the category of an AOC.

- Building 265 is indicated by the PSAIR as having two then-active chemical operations on the second and third floors. Several other operations, such as painting and coating, on the ground floor also occurred in the past. Direct contact with soils from these operations was reported by GTI as being only possible from the basement. Clearly, drains from the various floors to "feeder" sewer lines under the building and extending to it could serve as potential

pathways and sources. Chemicals cited as being used or stored at this building include 1,1,1-TCA, dichloromethane (methylene chloride) and lead. This building is situated upgradient from monitoring wells MW-29, MW-30 and CM-10. Well CM-10 displays a persistent Freon-11 problem.

Building 265 was excluded from the 1995 soil gas survey since GTI argued that the chemical operations --- at least during HMSG's tenure "... were on the second and third floors, and were not known to include use of Freon." Having the HMSG chemical use restricted to the second and third floors narrows the pathway focus (although just for their operations but perhaps not for Bunker Ramo) to the building-drain/"feeder" sewer-line system. In addition to providing facility information on such potential pathway(s), HMSG also needs to research the historical Bunker-Ramo usage at this building.

GTI's argument that MW-29 lies between this building and CM-10 is accurate; citation of MW-30 is inaccurate --- since the flow regime has been somewhat radial. The groundwater contours flatten out on the May 13, 1996 groundwater "gradient" map prepared by GTI, but MW-30 still lies north and "off-vector" from CM-10. Whether or not any soil investigation needs to be done at Building 265 depends on further record evaluation and whether or not a satisfactory alternative source(s) is determined for the Freon-11 contamination in well CM-10.

Since operations at Building 265 have now ceased, input of any hypothetical contaminants from it should have been cut-off and transport of any residual soil contamination to ground water should be diminishing. If a leaky sewer line at Building 265 were to be somehow responsible for the observed groundwater contamination at well CM-10, renewed use of this building might lead to a new influx of pore-water and a subsequent increase in contaminant concentrations at well CM-10 --- even with no renewed chemical use by the new occupant --- strictly from increased mobilization of any residual soil contaminants. The principal potential pathway at this building would be the building drain/"feeder" sewer-line system, in as much as the HMSG operations using chemicals were reportedly restricted to the second and third floors. Specifically, sink and floor drains, through their ultimate connection to the "feeder" sewer line under the building and the "feeder" line connection to the site-wide main sewer line, need to be considered. It was also noted that a sump and drain system of some kind existed outside the building proper. An anomalous area of vapor-phase Freon 11 contamination was mapped during the EST soil gas survey in the asphalt paved

parking area to the south of Building 265 and west of Building 274. No connection to either Building has as of yet been determined. This parking area is downslope from Building 265. Building 265 sits on a terrace --- with adjacent parking separated by a steep vegetated slope from the parking area which showed the Freon-11 on the next terrace down. There is probably some form of surface drainage connection between the two terraces which needs to be evaluated as a potential pathway. Building 265 needs to remain an AOC until HMSG can demonstrate that soils underlying or adjacent to the basement are not responsible for the well CM-10 pollution, e.g., as result of hypothetically leaking "feeder" sewer lines which conveyed waste from operations previously conducted within the building. This will entail, as a first step, evaluation of the HMSG/Bunker-Ramo operations formerly conducted in the building, and mapping of the various "feeder" sewer lines as potential pathways to soil. Hydro-punch investigation stepping back upgradient from well CM-10 is necessary to separate the AOC(s) which may be responsible for the observed contamination at well CM-10. Additional work may also include more narrowly focused soil gas investigation of segments of the "feeder" and site-wide sewer lines at this building, and an evaluation of whether there is any connection between them and the vapor-phase Freon-11 concentration observed in the asphalt paved parking area downslope from Building 265.

- The 1989 PSAIR describes Building 268 as having 17 then-active chemical use areas. There is only one monitoring well nearby, well CM-12, which is located some 100 feet downgradient from the western end of the building. It exhibits elevated 1,1-DCE concentrations. Operations in the chemical use areas of this building were described as including solvent cleaning, spray painting, coating, copper etching and vapor degreasing. The PSAIR cites that 1,1-DCE was one of the solvents used in low quantities for cleaning together with dichloromethane (methylene chloride). Although many of the chemical use areas were described as being on the second floor, presence of at least one industrial waste clarifier was indicated. An early visual inspection and then-current "...quantifiably insignificant..." use were cited by HMSG's consultant in the PSAIR as being the basis for no field investigation and no further consideration of this building as a potential source. Such reasoning is insufficient to exclude this building from the corrective action process.

  Subsequently in 1995, GTI has argued that "[L]ow level use of containerized chemicals in a laboratory should not render the vicinity an Area of Concern." This argument belies

description in the PSAIR although agreeing with the PSAIR consultant's conclusion. GTI implies that presence of a UST "... near the building." is necessary to indicate a potential threat of discharge. However, it is the GSU's opinion that the described chemical uses do not need a UST to provide potential pathway. Even if most of the HMSG activities took place on the upper floors, floor/sink drains provide contaminant pathways to the feeder sewer line beneath the building, etc. If this feeder sewer line leaked, the waste could be discharged to the surrounding soils. For example, it appears that some form of treatment took place at the second floor before waste water was discharged through the drain lines to the feeder sewer line. There also appeared to be some form of related activity on the first floor. Outside the building, a short distance to the west and upgradient of well CM-12, a large manhole cover was observed which may indicate a segment of the site-wide sewer line passing fairly close to the building.

GTI also made arguments that (a) in 1993 and 1994, well CM-12 contained no detectable VOCs, and (b) borings B-SL-2 and B-SL-3, placed along the side-wide sewer line segment just west of Building 268, had zero PID readings and non-detect VOC soil matrix concentrations. The lessening of VOCs in well CM-12 does not obviate Building 268 or the associated "feeder" or site-wide sewer-line segments as potential past sources. Any direct contamination input from the building would have been expected to cease with cessation of HMSG operations, and soil migration of residual soil contamination would be slower without leakage, leading to diminished concentrations in the well. Two soil matrix samples are insufficient to be definitive with regards to the nearby site-wide sewer line segment and PIDs are not an acceptable means of acquiring vapor-phase information. Furthermore, such sampling would first be needed at the building drain/"feeder" sewer line connection for Building 268 and where the "feeder" would have joined the main site-wide sewer line. In other words, neither the PSAIR conclusions nor the GTI arguments eliminate Building 268 as a possible source of groundwater contamination.

There may be a long-term concern with the building from renewed soil migration resulting from increased usage of the building by the new owner/occupants, which might lead to an increase in groundwater contamination.

- HMSG and its consultant considered Building 269 as one of five potential chemical source areas and performed some investigative work on its periphery. Eleven then-active chemical use areas were cited in the PSAIR. Operations included cleaning, vapor degreasing, liquid degreasing,

plating, painting, etching, etc. For example, the degreaser was active from 1967 to 1985 and was indicated as having 1,1,1-TCA stored or used at it but also as having a permit allowing for use of methylene chloride and trichlorofluoro-ethane (Freon). The plating room included a degreaser and a clarifier pit with cited chemicals including copper, nickel, chromic acid and gold-cyanide. A network of trench drains, serving as an over-spill collection system, in the former plating room led to the clarifier pit.

Cleaning stations (rooms 1295B&C and 1475C) utilized chemicals which included TCE, 1,1,1-TCA and isopropyl alcohol (IPA). At the time of the PSAIR, 1,1,1-TCA was the dominant solvent used in terms of volume---perhaps as much as 1,000 gallons a year from this building. However, some use of dichloromethane (methylene chloride) was also reported together with IPA, thinner, developer, hydrochloric acid, nitric acid, iodine, potassium iodine, ceric sulphate and ammonium persulphate. Two linked "storage pits", P-1 and P-2, are located outside and immediately adjacent to the east of Building 269. P-1 was active as late as 1993, holding photographic process wastes and P-2 is a former clarifier for plating operation wastes which subsequently served to contain outflow from P-1. P-2 was described in the 1989 PSAIR as an underground non-waste sump used for neutralized acids and plating rinse water which typically contained waste solvents derived from degreasing associated with plating operations.

Monitoring wells CM-4, CM-4d and CM-5 are established upgradient and wells CM-6 and CM-6d are downgradient. It was cited in the PSAIR that well CM-6 contained "... little or no water ..." and 6d was non-detect for 1,1-DCE and TCE. However, CM-4d, immediately upgradient adjacent to the building exhibited 1,800 μg/l of 1,1-DCE and 310 μ/l of TCE. The PSAIR postulated no sources upgradient of this well. It is also noted that CM-6 is not directly downgradient of CM-4d. While the former plating room was discussed in the PSAIR, other rooms, such as 1115A with its degreaser were not. Active sources of groundwater contamination in the form of residual soil contamination may exist underlying this building either as a result of direct leakage from the plating pit area or from "feeder" sewer lines conveying waste from the laboratories to the main site-wide sewer lines. Investigative work was performed by GTI outside the building in 1994. Three soil borings were emplaced along the eastern periphery of the building from which samples were analyzed for metals and cyanide but not for VOCs. EST performed a soil gas survey in 1995, which collected vapor-phase VOC data from outside the building. However, no borings or soil gas probe have been emplaced through the

Building 269 floor to investigate the plating pit or any association floor drain/sump system. While the plating pit room is below grade, the plumbing connection from the plating pit to the external sumps/P1 and P2 were reportedly above ground. The floor of the plating pit room reportedly was sloped to areas of the room from where waste and spillage were collected.

HMSG agreed to conduct a limited soil gas survey which would include the periphery of Building 269, at the east near clarifiers P-1 and P-2. This work comprises "Area 1" of the 1995 "Report on Soil Gas Survey ..." prepared by GTI. No work was performed at the former plating room pit or sumps inside Building 269. Probes SG-18 and SG-43 were driven "to achieve the depths" of the foundation of Building 269. These deeper probes reportedly encountered bedrock in several instances but probably SG-45 and SG-18 reached to depth at 9 or 10 feet bgs, respectively. The results were ND at a detection limit of 1 µg/L. SG-11, at 9.5 feet bgs was adjacent to P-1, exhibited about 4 µg/L of 1,1-DCE. Other probes in the vicinity were non-detect. It could be alternatively interpreted that SG-11 implies leakage at either P-1 or the former plating pit/sumps in the interior of the building or that the VOCs are from tank T-3, some distance away. However, metals analyses from the vicinity of P-1 and P-2 reveal beryllium and cadmium at concentrations exceeding the closure performance standards for the HWSA and this area exhibits PCE contamination not characteristic elsewhere. Therefore, the existing data set probably indicates that releases occurred at P-1 and P-2. These must be considered SWMUs. The interior plating room pit/sumps in the east end of the building should also be considered SWMU(s) because there has been no direct investigation of them.

It is believed that in order to fully evaluate soil contamination at Building 269 and to ascertain whether there was leakage from the plating pit/sumps, sampling below the floor needs to be included as part of the RFI. Sampling of the original concrete underlying the present floor should also be performed to determine whether the former plating pit and surrounding floor contain hazardous leakage waste constituents.

It should be noted that the existing floor of the former plate area has been filled and brought up to grade --- no sumps are observable now, and, therefore, the floor of the building serves as a cover or cap. However, there are several caveats. It should be considered that the older concrete of this plating room may contain residual contamination, etc., above the TTLC or STLC, and should, if

demolition were to occur, be treated as hazardous waste. There also may be direct contact health hazard associated with parts of the concrete floor and walls. Finally, leakage from sewer lines, water supply lines, or watering of foundation planting could provide the vehicle for re-mobilization of any residual soil contamination. Therefore, even if no remediation is to occur underneath the building, a deed restriction may be necessary. The soils external to the building may need to be remediated based upon the HWSA closure performance standards.

- Some 12, then-active, chemical use areas were cited in the PSAIR as having been located in Building 270. Operations were described as having included vapor degreasing and solvent cleaning which used 1,1,1-TCA (nearly 2000 gallons per year) and may have included methylene chloride and trichlorofluoroethane as well. In fact, dichloromethane (methylene chloride) was reportedly present in low volumes as was Freon (trichlorofluoroethane) and benzene. While those chemical use areas on the second floor may not have posed a direct waste discharge threat to soil, waste or spillage disposal conveyed from such areas by the building drain system to sub-grade "feeder" sewer lines represents a potential pathway.

  There are no monitoring wells immediately downgradient. The 1994 "Report on Facility-Wide, Site Assessment, Hughes Missile Systems Company, Canoga Park, California" included analytical data from soils on the periphery of the building. These data did not reveal either VOCs or hydrocarbons. However, neither these data nor McLaren Hart's one-time observation of "... good housekeeping practices ..." inside the building and their subsequent conclusion of "... quantifiably insignificant ..." usage (excepting the degreasers), eliminate this building as an AOC or as a potential SWMU. Further evaluation with respect to the previous interior uses and waste disposal pathways needs to be done as part of the corrective action process.

  GTI argued in its 1995 summary review of the GSU walk-through "... there is no potential migration route to soil and groundwater were identified during the walk-through." This is not wholly accurate. Although HMSG chemical usages were reportedly confined to the second floor, a building drain system exists which presumably connects through "feeder" sewer lines to the site-wide sewer line. These were not directly "observed" by the GSU, but must exist as a general condition of occupancy permits.

  With respect to groundwater monitoring or recovery wells, GTI makes the argument that CM-6D, CM-12, MW-20 D/S and RW4

through RW9 "... are positioned to test downgradient groundwater ..." Actually, well CM-6D sits at the southeastern corner of Building 270 and RW-5 sits about 100 feet to the northeastern sector of the west side. This leaves a downgradient arc of over 90 degrees uncovered. Well CM-12 is not near-field and neither are MW-20 D/S. GTI indicates that only monitoring wells CM-6D and MW-20 D/S have been consistently ND for all VOCs. There is no groundwater data for the uncovered arc. The foregoing evaluation indicates that Building 270 cannot be precluded as a potential source, needs to remain an AOC, and may need to be assessed in some active fashion in the corrective action process. Finally, despite GTI's contention in the May 15, 1995 AOC response letter, it was not "agreed" that Building 270 was no longer an AOC. It was, however, agreed that no soil gas would be required within the building as part of the investigative efforts being proposed by HMSG at that time. Several concerns do need to be addressed, e.g., the potential pathways at the building need to be evaluated, i.e., the building drains/"feeder" sewer line (connection G). Hydro-punch investigation, followed by at least one near-field well in the uncovered arc should be considered. The same re-mobilization of potential soil contamination arguments as existing at Building 269 apply here. However, before any active investigation is required, additional evaluation of existing data and plans of the building drain/"feeder" sewer system needs to be performed.

- Building 271 contained a spray paint booth and usage of 1,1,1-TCA and dichloromethane (methylene chloride) was cited in the PSAIR. This building is relatively small and is situated between Building 262 and 263. GTI's contention that the walk-through or "field evaluation" on March 24, 1995, "... revealed no obvious potential migration pathways for chemical release from the building." is not wholly accurate. The building was certainly not "solvent-tight" and the courtyard area beyond it, while paved, did exhibit some cracks, etc. GSU staff disagrees with GTI's statement that "... no further investigation of this area is required." Moreover, MW-24 is not downgradient as stated by GTI, despite its lack of contamination. The observed groundwater contaminants at well CM-8d are more nearly downgradient.

  The soil gas work done by EST covers part of Building 271 but not all. SG-25 (3' bgs) is some 50 feet from the west end of the building --- and although ND, does not wholly "clear Building 271". It is still suggested that the soil gas survey be extended under this building --- unless an alternative soil source has been definitively determined elsewhere for the "eastern flow regime" groundwater

contamination at CM-8d. Therefore, this area remains an AOC and may require some further active investigation, such as soil gas and/or hydro-punch work, to verify it as a non-source.

- Building 274 was reported in the PSAIR as having been used for solvent cleaning, although these activities were not fully described. Specific solvents listed in Table 2 of the PSAIR included 1,1,1-TCA and Freon-11. This building is situated upgradient of MW-29 and is quasi-upgradient of CM-10 which exhibits significant Freon-11 contamination. The earlier HMSG consultant's citation of good housekeeping, visual inspection and "quantifiably insignificant" usage are insufficient to remove this building as a potential source and AOC.

  The GSU walk-through revealed a cooling unit situated outside the building on its northeast corner. HMSG was asked to place at least one soil gas probe near this unit --- in the line of surface flow away from the unit (in the event that overfilling spillage during maintenance or long-term leakage of coolant may have occurred). GTI argued that no solvent cleaning actually took place in the building --- presumably referring only to HMSG occupancy. They stated that only a hydraulic pump and a chiller could have served as contaminant sources within the building. Freon-11 was detected at 6 µg/L in SG-44 near the cooling unit. Therefore, a source of Freon-11 contamination is within, at, or nearby the building and GTI's contention that Building 274 "... is no longer an AOC and no further investigation is needed." is in error. Since, Freon-11 is evidence of a release, the cooler unit area may need to be considered a SWMU. Further active investigation needs to be conducted to assure that this area has not been or will not be a continuing source of groundwater contamination. This should include further soil gas and/or hydro-punch work.

- Further information needs to be provided with respect to the cleaning operations reportedly conducted by HMSG in Building 276. At the time of the PSAIR, 1,1,1-TCA was either utilized or stored in the building with usage cited at a low rate of less than or equal to 5 gallons per year. Prior operations by Bunker-Ramo were not described. There are no monitoring wells immediately downgradient of this building and hence no information on possible near-field groundwater contamination at the building or on the near-field groundwater flow direction. Based on the available data, the building might be considered upgradient of well CM-10 or CM-17, and although neither well has reported 1,1-DCE or TCE, Freon-11 occurs in CM-10.

GTI indicates that this building was primarily used for administrative functions and that borings B-SL-7 and B-SL-8 and B-RUDM-3 were "... drilled in generally downgradient position." and were all ND for VOCs. Because of the foregoing, GTI contends that Building 276 should not be an AOC and requires no investigation. The positions of the cited borings and the related soil matrix samples have little or no relevance to Building 276 proper. The walk-through revealed at least one "floor sink" in a "process room". More importantly, there appears to be a chiller or air conditioning system in or adjacent to the building's southwest side. There has been no investigation of the building drains or "feeder" sewer line(s) underneath the building. Therefore, GTI's conclusion about the GSU walk-through results are in error. Soil gas samples were obtained at points along segments of the main site-wide sewer line which runs southwest to northeast along the south sides of Buildings 276 and 274. The results indicated that there did not appear to be any continuing source(s) in the section of sewer line nearest Building 276. However, soil gas data in the parking area between the two buildings revealed the presence of significant amounts of vapor-phase Freon-11. No obvious connection between either Building 276 or 274 and the vapor-phase contamination in this parking area has yet been established. It should be noted that a down-drain(s) from an upper parking terrace outside Building 265 may affect the lower parking area between Building 276 and 274. Therefore, all three buildings still need to be considered AOCs until the actual Freon-11 source is established. The parking area may ultimately need to be treated as a separate SWMU, but active investigation is needed at Building 276 to establish that such is the situation.

- Building 281 was cited in the PSAIR as having two then-active chemical use areas, consisting of a "Controlled Materials Storage Area" and a "Maintenance Shop". Dichloromethane (methylene chloride) is cited as having been stored or used at this location. The building is situated between well CM-8d, downgradient, having Freon-11 VOC groundwater pollution and CM-9d, cross-gradient, which exhibits considerably less pollution. Building 281 also adjoins an area where diesel tank removal occurred.

  GTI contends that since Building 281's chemical use "... was restricted to the first floor, which overlies a basement.", that there is no potential chemical migration pathway to be identified. This is not reasonable since chemicals discharged into building drains reach below-grade "feeder" sewer lines under and adjacent to the building. Therefore, Building 281 has potential pathways. Moreover, Bunker Ramo

usage of the building has not been clarified by HMSG. There is a clear groundwater problem adjacent to the building. GTI's argument that this problem has diminished is not wholly re-assuring, since the building has not been in use. If there has been a "feeder" sewer line source under the building, then the soil surrounding the "feeder" sewer line may still contain VOCs. Renewed use of the building drains could renew hypothetical leakage and re-mobilize soil contaminants to migrate into ground water. Therefore, concern still exists. The soil gas work at well CM-8d did not clear Building 281 and its associated building drain/"feeder" sewer-line system. Further evaluation and perhaps investigation of the building may be necessary if a reasonable alternative source for the observed groundwater contamination at well CM-8d is not demonstrated. Specific relationships are unclear, but Building 281 should be considered an AOC subject to further evaluation.

- Groundwater and soils cleanup, while being performed under the LARWQCB as lead agency, indicate that the former underground gasoline tank system T-1, T-2, and associated pump island near Buildings 272 and 282 needs to be considered a SWMU. Similarly, soils cleanup under the auspices of the LARWQCB, removal of 1000 yd^3 at the diesel underground tank cluster T-7, T-8 and T-9 located to the east of Building 281 and a small quantity of "odor-exhibiting soil" from the 500 gallon underground tank pair T-5 and T-6 which stored sulfuric acid and waste oil immediately west of Building 263, means that these also need to be considered SMWUs. No hydrocarbon contamination was reported from diesel tank T-10 just to the south of Building 281 and it should not be considered an AOC any longer.

  Recent regulatory concerns about MTBE means that DTSC does need to require, if not being presently required by the LARWQCB, that the wells near-field to these SWMUs must be sampled and analyzed for MTBE. If determined to be present, then additional soil evaluation could be required at them. The 1995 EST soil gas survey did not establish presence or absence of MTBE. Moreover, these samples were obtained near the T-10 diesel fuel tank. No soil gas work was performed at T-7, T-8, or T-9.

- It is noted that halogenated and aromatic VOCs together with bis(2-ethylhexyl)phthalate were reported from the soil at the tank pair T-5 and T-6 and that clean-up at T-7, T-8 and T-9 tank cluster left some soil hydrocarbon contamination in place. The ERPCRS indicated that even though the T-7, T-8

and T-9 tank cluster had soil excavated, they still needed to be considered "... potential release points to groundwater." Tanks T-5 and T-6 are located upgradient of well CM-8d, which exhibits considerable amounts of 1,1-DCE.

As with tanks T-7, T-8, T-9, and T-10, no evaluation was made of MTBE in either soil or in the ground water at well CM-8d. It may be necessary that all downgradient wells be evaluated for MTBE and that soil sampling for MTBE be performed.

- The 60-85 gallon tank T-12 area just to the south of Building 270 was of concern because it had stored solvent waste---including acetone, 1,1,1-TCA and isopropyl alcohol. Although this tank had been converted to an aboveground storage tank, details are lacking with respect to the conversion process and whether this was the original underground location. The 10,000-gallon T-13 tank containing diesel or fuel oil was located a short distance away to the southeast.

  The 1995 soil gas survey included five points around the T-12 area. All were ND at 1 µg/L detection limits for VOC's. Therefore, this AOC can be considered to have been satisfactorily evaluated and no further action is required.

- The 60-85 gallon T-14 tank (solvent waste---including acetone, 1,1,1-TCA and isopropyl alcohol) is described as being located south of Building 269 in the 1989 PSAIR but is not discussed in the 1993 EPRCRS. The existence of a concrete vault and the fact that it is indoors <u>does not</u> eliminate the possibility of leakage due to overflow or spillage. GTI needs to describe what would have happened if spillage had occurred, etc. The explanation that "T-18" is really a typographical error is acceptable based on GTI representations but T-14 should remain an AOC until further explanation is provided.

- HMSG has performed soil matrix sampling at widely spaced intervals along the main sewer line around the site. In part this was because Freon-11 has been consistently identified in ground water sampled from well CM-10, which is located downgradient from the HMSG connection with the public sewer line at "manhole 13". Groundwater pollution appears to have extended off-site downgradient from well CM-10.

  HMSG has not explained the Freon-11 source with either soil matrix or soil gas sampling to date. Whatever the source area or areas, it or they should be considered SWMUs when identified. The source(s) may include a number of the

aforementioned AOCs, segments of the site-wide sewer line or unidentified source-types. HMSG needs to extend its 1995 soil gas survey to evaluate those AOCs upgradient from well CM-10 which might be responsible for the observed contamination.

HMSG performed only a partial evaluation of vapor-phase contamination along the site-wide sewer line upgradient of well CM-10 in 1995. GTI's argument about the sufficiency of test borings along the site-wide sewer line revealing no VOCs is not reasonable. Specific sections of the site-wide sewer line still need to be evaluated near the AOCs as well as the "feeder" sewer lines under those buildings, and an explanation provided for the Freon-11 found in the parking area between Buildings 276 and 274.

CONCLUSIONS

- Based on the existing data set, some of the AOCs need to be considered SWMUs. There have been demonstrable waste discharges---releases---to soil and ground water not attributable to the waste discharge at Tank T-3. These include PCE (ground water) and Cd and Be (soil matrix) at P-1/P-2 outside Building 269; Freon-11 (vapor phase) in the parking area soils between buildings 276 and 274, in the ground water at well CM-10---downgradient from Buildings 265, 274, 275, 276, and 277---and in the soils near the air conditioning unit outside Building 274; chlorinated VOCs---source unknown, but observed in well CM-8d---downgradient from Buildings 262, 263, 281, and near-field to Building 264; and chlorinated VOCs (vapor phase) in the soils at Buildings 272 and 282.

- Additional investigative work needs to be performed in several areas to discover and identify the SWMUs responsible for observed soil and groundwater contamination.

- Contamination from waste discharges at HMSG have already migrated off-site. In the instance of the on-going groundwater remediation at Tanks T-1 and T-2 for the Underground Tanks program at the LARWQCB, current clean-up efforts may remediate this, but in the instance of well CM-10, neither the lateral or vertical extent nor maximum concentrations in off-site ground water have been demonstrated and there is no remediation on-going.

- The former plating pit in Building 269 was paved over at some point in time. There is no evidence of investigations at or below it relative to leakage or contamination of the pit construction materials themselves. Additional

investigative work needs to be performed to determine the condition of the pit. Alternatively, the location can be carefully described and included in a deed restriction.

- While the on-going clean-up work and groundwater monitoring relative to the underground fuel tanks T-1 and T-2 near Buildings 272 and 282 is an appropriate part of the overall remedy and should be continued, it does not address all of the RCRA corrective action needs facility-wide and additional investigative and remedial work is warranted at the HMSG facility.

- Arsenic (As) has been reported from the soil at 5 feet bgs (B-SL-4) along the sewer line at 42 mg/kg. Even using the 99th percentile background closure performance standard proposed by HMSG for arsenic which was 28 mg/kg, this can be concluded to represent waste discharge from the sewer line. This means the sewer line in this area needs to be investigated as a possible SWMU. Similarly, cadmium (Cd) (17 mg/kg) and beryllium (Be) (.87 mg/kg) have been reported from soils at P-1/P-2 at 5 feet bgs (BPHP-2) at concentrations greater than background. PCE has been reported from vapor-phase measurements there, but nowhere else, and cannot be considered as being derived from the Tank T-3 HWMU. Therefore, the P-1/P-2 area must be considered a SWMU.

- Simply because chemical uses have been restricted to the upper floors of given buildings does not mean that there is no potential pathway. Laboratories and other chemical use areas typically have drains which lead through the buildings to below-grade sewer lines which feed in turn to the main site-wide sewer line system. Therefore, source areas and pathways may lie concealed beneath the various buildings. The significance of such potential sources is that renewed usage of the building's drains may re-mobilize contaminants. Chlorinated VOCs can of course continue to migrate to ground water without additional leakage. Finally, fluctuations of groundwater elevation may re-mobilize soil contaminants. Therefore, the sources for the observed groundwater contamination need to be isolated.

- The April-June "Groundwater and Remediation System Monitoring Quarterly Report" dated July 10, 1996, shows a significant increase (3 to 4 times the September 1995 concentrations) in 1,1-DCE in well CM-8d. HMSG has argued that concentrations are dropping and that no investigative or remedial actions are warranted relative to the source of the contaminants in this well. Similarly, trichlorofluoromethane (Freon-11) concentrations in well CM-10 increased. It is unknown whether these contaminant

increases are due to reoccupation of some of the buildings by the new owners of the former HMSG facility resulting in increased flow through sewer lines and possible leakage re-mobilizing pre-existing soil contaminants or whether fluctuating groundwater elevations through the winter served to re-mobilize contaminants. The July-September quarterly monitoring report, dated October 7, 1996, shows the concentrations decreasing, but still above some of the historical levels, e.g. 39 µg/l of Freon-11 (February 1996) for well CM-10. It is noted that the groundwater elevation at well CM-8d rose by only .12 feet while the 1,1-DCE concentration dropped from 460 to 110 µg/l. At CM-10, the elevation dropped by .48 feet and Freon-11 concentrations dropped from 110 to 88 µg/l. It is concluded that investigative work still needs to be performed relative to the sources of contamination in those wells and consideration given to uncontrolled flushing of contaminants into ground water [without waste discharge requirements (WDRs) being adopted for this continuing threat to ground water by the LARWQCB] as part of the RCRA corrective action process.

- HMSG has not accounted for the site activities of former occupants Bunker-Ramo and the Rocketdyne Division of Rockwell International. The PA prepared by Ecology and Environment, Incorporated and the various facility assessment documents provided by HMSG do not detail that usage. There is no historical aerial photographic analysis to determine usages and construction/development of the site. It is concluded that such facility information still needs to be provided. The South Coast Air Quality Management District (SCAQMD) permits covering air emissions for a spray paint booth, five TCA vapor degreasers, and a chemical milling tank, need to be examined and reconciled with information in the facility assessment documents. HMSG was cited for storing waste in an unpermitted area for more than 90-days. This area needs to be identified and evaluated. The locations for all three industrial waste water clarifiers for which permits were issued by the Los Angeles Bureau of Sanitation needs to be reconciled with the existing facility assessment.

- The radioactivity cited in the PA, which was found in the ground water throughout the site has not been fully demonstrated to be solely the result of naturally-occurring background levels as maintained by HMSG, despite the "Phase One Remedial Investigation at Hughes Missile Systems Group Facility, Canoga Park, California", dated December 20, 1990, and prepared by Mclaren Hart. Several reports were prepared for HMSG on the issue of elevated radioactivity in the ground water at the facility. These include:

(1) "Radioisotope Review and Comparison for the HMSG Facility, Canoga Park, California", July 30, 1991, by McLaren/Hart Environmental Engineers Corporation;

(2) "Investigation of Radioactivity in Groundwater at the Hughes Aircraft Company, Canoga Park Facility, Canoga Park, California", January 23, 1993, by Groundwater Resource Consultants, Inc.; and,

(3) "Results of Radiological Sampling of Monitoring Wells, December 1991, HMSG, Canoga Park Facility, Canoga Park, California", March 27, 1992, by Groundwater Resource Consultants, Inc.

These reports addressed the issue of anthropogenic radioactivity in a sidewise fashion. Variation in radiologic analyses amongst various other sites in the San Fernando Valley were used to infer the "naturalness" of such measurements at HMSG; because all the Gross Beta results were below the compliance screening level of 50 pCi/l, it was inferred that no man-made radionuclide were present; uranium concentrations in several samples exceeds MCLs for uranium, but this was attributed to high "natural background TDS concentrations"; isotopic mass percentage of those samples with elevated uranium levels, indicate that the percentages are close to the U.S. EPA's definition of naturally occurring uranium. The most persuasive argument is that of the mass uranium isotope percentage. It, however, does not obviate the possibility of some of the Gross Beta radiation being due anthropogenic radioactivity from isotopes other than uranium.

RECOMMENDATIONS

- A RCRA Facility Assessment (RFA) needs to be performed based upon the existing investigation data from both LARWQCB and DTSC involvement at the various SWMUs and AOCs, the information which has been presented to date by HMSG and its consultants, and a rigorous effort to recover all available construction plans, permits and other such records relating to the site. The Preliminary Assessment (PA) which was performed by consultants (Ecology and Environment, Incorporated) in 1991 for the U.S. EPA is relatively incomplete, unsatisfactory in that all the then-available data and information was not evaluated, and did not or could not have utilized data and information that is now available.

- Despite the extensive, but relatively focused investigations under the LARWQCB, the ongoing air sparging groundwater cleanup and monitoring, and the soil gas work performed for DTSC, a RCRA Facility Investigation (RFI) needs to be performed at the former HMSG facility. In fact, it is partly because of the available data that the RFI needs to be performed. The work should include some additional soil matrix and soil gas sampling at various locations, hydro-punch or equivalent work in several areas, and installation of additional monitoring well(s) at one or more locations. Ground water around the suspect buildings may be characterized with hydro-punch techniques to isolate the source building and soil sampling performed underneath the buildings to determine the levels of residual soil contamination.

- The on-going groundwater clean-up activities being performed under the auspices of the LARWQCB Underground Tanks Program should be given equivalency as an Interim Measure (IM) under the RCRA corrective action procedures. It needs to be recognized that the specific groundwater remediation selected, air sparging, primarily directed at clean-up of groundwater contamination from underground tanks, is also acting to clean up the vadose zone at two SWMUs---Buildings 272 and 282---and the former T-3 hazardous waste management unit (HWMU) which is subject to post-closure. The on-going groundwater monitoring at well CM-8d and CM-10 should also be credited as separate IMs even though the SWMUs which have caused the observed contamination in those wells have not been identified.

- A corrective measure study (CMS) needs to be performed which considers all of the on-going interim measures of groundwater and vadose zone remediation at one area of the site and groundwater monitoring at other SWMUs and AOCs across the site. This on-going work clearly needs to be adopted as part of the final remedy for the site even though it may not be the complete remedy. For example even without an RFI having been performed, the following need to be considered for corrective measures as part of a final remedy: a) the former plating pit SWMU in Building 269 is likely to require a deed restriction measure to assure that any contaminated concrete, now covered by a new floor, be evaluated and handled as a hazardous waste---if necessary---at such time as demolition of the building occurs at any time in the future; b) the presently unknown source for off-site impact from the Freon-11 observed in the parking area between Buildings 276 and 274 and at well CM-10 may need remediation; c) the presently unknown source for the observed contamination at well CM-8d may need remediation or deed restriction to prevent continued waste discharge form

soils to ground water; d) the concentration of beryllium and cadmium at the P1/P2 SWMU outside Building 269 is above the closure performance standards approved for the HWMUs and may need remediation to be consistent; e) groundwater monitoring, initiated by the LARWQCB for their tank investigations, may need to be extended for some period of time as a means of corrective action effectiveness monitoring at locations downgradient of AOCs and SWMUs; f) vadose monitoring at the Building 272 and 282 SWMUs may be needed for some period of time to assure effectiveness of the air sparging groundwater clean-up in cleaning the soils at the SWMUs; g) corrective action effectiveness monitoring will need to be continued at the Tank T-3 HWMU---probably using the existing monitoring network.

- The foregoing exemplary remedies will need to be implemented or in the case of the air sparging being performed under the auspices of the LARWQCB, continue to be implemented under the corrective measures implementation (CMI) component of RCRA corrective action.

- A post-closure plan should be called in relative to the former Tank T-3 HWMU. Since the underground tank had no secondary containment, it must be treated as a land disposal unit. The post-closure plan should address both vadose zone and groundwater monitoring issues as well as corrective action effectiveness monitoring of the on-going air sparging being performed under the auspices of the LARWQCB. At least one new upgradient well needs to be established outside the influence of vapor-phase transport from residual soil contamination at the former Tank T-3 HWMU. The post-closure plan should include all of the necessary corrective action elements relative to the various SWMUs.

- While the isotope mass percentage of those samples with elevated uranium levels appear to fit the U.S. EPA's definition of naturally occurring uranium, additional radiologic sampling of the monitoring wells needs to be performed. The data provided by HMSG indicate a general pattern of association of higher radiological concentration with certain wells on the east and southeast side of the site. The association may simply be due to natural variation across the site, but these variations are not necessarily explained by attribution to total dissolved solid variations. The fact the all Gross Beta results were below the compliance screening level of 50 pCi/l does not necessarily mean that there are no anthropogenic radionuclides present. Sampling and analysis for such man-made nuclides could, however, demonstrate that the Gross Beta results were not related to them. In order to fully rest this issue and assure that radioactivity is unrelated

to site actions, additional samples should be obtained and analyze for anthropogenic radionuclides; the formation materials from the various wells should be evaluated to determine if there is any correlation to the distribution pattern; the total dissolved solids data need to be plotted together with the radiologic data.